

A  
TREATISE  
OF  
CHIRURGICAL OPERATIONS

After the  
Newest, and most exact Me-  
thod founded on the Structure  
of the PARTS.

CONTAINING  
Their Causes, Signs, Symptons,  
together with their Explanation,  
and many curious Observations.

To which is  
Annex'd a General Idea of  
WOUNDS.

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Written Originally by *Joseph De la*  
*Charrier* ; and Translated into  
*English* by *R. B.*

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*Handwritten text, likely a signature or name, appearing below the coat of arms.*

24 October



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The Author's  
P R E F A C E.

**I** Was so well satisfied with the *Authentic Approbations*, that those learned Physicians have honour'd me with to give my Book, that I was resolv'd to make no Preface: but an accident happen'd, which I thought convenient to make known to the Reader. A certain Person who passes for a Man of great Merit, and who is actually in a Post to distinguish himself, desir'd, some both of his and my Friends, that something might be said in this Tract to his advantage. I was in no great trouble to grant him his Desire; and I began to flatter my self that he had

## The Author's Preface.

*some esteem for my Work : nevertheless he has publickly declared himself, against that he had so well approved in particular ; and many honest Gentlemen have been scandalized at his ill Temper, as well as my self. One may well think, he imagined that this Book, would not have the success it deserves, and he has reproached me to have made use of his Writings : Its no way disadvantageous to me, that a man of his Rank should attribute to himself the Fruit of my Labours. In the mean time the Reader will very easily see, that I am no ill temper'd Man, nor any way troublesome, since in those things which are not my own, I have cited the Authors, among which one will not find the name of the Sieur Du — — its likely he himself has made use of the thoughts of the aforesaid Great men, but has not been so ingenuous in owning it as I. Nothing's so strange as Pride ! It often carries*  
us,

## The Author's Preface.

*us, to some excess which serves but the more to make our Faults and Weaknesses better known. I'll say nothing of my Book, only I believe I have advanced little but what's founded upon Reason and Experience, which I'll clearly demonstrate according to the Structure of the Parts. I desire the Reader to judge of it without prejudice, and that he would not esteem Mr. Du — to be the Author of the good it contains.*

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## APPROBATION.

**T**HE Faculty of Physick in the University of *Paris*, having heard the extraordinary Character that Mr. *Le Meine*, and Mr. *Enguehard*, Doctors, Regents in the same Faculty, gave of a Book of Chyrurgical Operations composed by Mr. *Charrier*, approve this Work, and think it most worthy to be Printed,

*At the Physicians Colledge  
at Paris, Thursday  
19. October, 1690.*

Signed Legier,  
*Professor to the King, and  
Dean of the Faculty of  
Physick.*

## APPROBATION.

**B**Y the Order of my Lord Chancellor, I have examin'd this Manuscript which treats of Chyrurgical Operations, which deserves to be printed, being inricht with a great number of Observations, which will be exceeding useful to Chyrurgeons: This I certifie to be true, nevertheless I submit to the Gentlemen Physicians of *Paris*. May 3. 1690.

Signed *Beiffier*.

The

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THE  
PREFACE  
TO THE  
READER.

**W**E have an English Pro-  
verb, though somewhat  
obsolete, yet true, which is, That  
good Wine needs no Bush; the  
same I think may well be said of this  
little Treatise, whose every line  
draws a sufficient Characteristic  
Note after it, without being usher'd  
in with any Prefatory Discourse to  
raise its value; yet since Prefaces  
(in this Age) are as much in Fashion  
as a pair of Gates before a stately pile

## The Preface

of Buildings, I hope a few lines will not be amiss, to do the Author some justice in so admirable a Tract as this is. I shall not pretend to write here an Encomium in the Praises of Chyrurgery, nor indeed can I give it those due Graces it worthily deserves, it having been already (by such a Cloud of learned Men) performed to my hand, whose most ingenious Footsteps I can follow, (and those only at a distance) not pretend in the least to imitate. As for the Contents of this Book, they are certainly praise worthy, the Author being so famous a Practitioner, especiall in the performing Chyrurgical Operations, his Works shew him to be a Man of sound Judgment and Learning; for he handles the Matter with such strenuous Arguments, sound Reasonings and so home, that I greatly admire none attempted before now to give it an English Garb, when I first perused it, and finding it applicable to what I had seen;



## to the Reader.

*seen, especially of late by an ingenious Gentleman of that Nation, I was resolved to make it speak our Mother Tongue, never designing it for a Press, only as a help in my own Business ; it having been Translated above fifteen Months before it came to the Publick View ; and perhaps never had by me, but that the Importunities of many Friends almost (if I may so say) forced me to it, besides hearing one or two were on the Design of rendering it into English, I thought it might be as well on my side, seeing it had been so long done, as theirs. It must for certain be of great Benefit to our younger Students in the Chyrurgical Art, (though our Seniors may not be ashamed of having so pretious a Jewel about them) who have not the opportunity of seeing many Operations perform'd, and those few Authors which have treated of them, have done it so slightly and superficially, that after*

## The Preface, &c.

*all your Study and Pains, you are as far to seek as ever, but this Tract is so exact, and Methodical, that it leads you (as it were) by the hand through the whole Course of every particular Operation, as well as if you saw it perform'd by any learned Artists: it not only demonstrates how to perform the Operations according to Art, but also shews the Distemper, explicates their Signes, Causes, Signes of those Causes, and Symptoms, according to the newest System of Philosophy, founded on the Mechanic Formation of the Parts.*

Yours

R. B.

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A  
T R E A T I S E  
OF THE  
OPERATIONS  
OF  
CHIRURGERY.

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C A P. I.

*Of Operations in General.*

**A**Mong all the Parts of Medicine, there is none so profitable as this which I undertake to treat of. It teaches *What it* us how we ought to perform the O- *teaches.* perations of Surgery, it explains the chief Pathologic Phenomena, fortifies us in the knowledge of the Subject,

*The Excellency of Chyrurgical Operations.*

ject, on which we practice? and I dare boldly say, that without the assistance of these Operations, the Art of Surgery would never have arrived to so high a point of perfection, which at this time it has attain'd; and without it, the Knowledge which relates to the explication of the Principal Distempers, would have been only dubious and uncertain, if light were not borrowed from hence by evident Demonstrations, and by reasons which experience authorises. It's a study which contains nothing but what's worthy to entertain our Wits, and engages those who love the Profession, to shew the advantages we receive from it. It's this which recommends the Artift, who dexterously reunites the Parts divided, who divides those discreetly that are united, who draws together with an extraordinary care, those bodies which in respect one to another are strange, and who with Art and Industry supplies whatever are wanting to our perfection, whence the end which he ought to propose to himself, is to perform well these four Operations, to disentangle all the difficulties they contain, and to observe all the circum-

circumstances which are precedent, concomitant, and which follow, in order to maintain the parts in their union and natural Situation.

Here I have a large Field to dilate my self into the praises of Surgery ; but (besides that the shortness of time does not permit me) I must acknowledge I dare not undertake it, least I should sink under the weight of so painful an enterprize ; for all the Authors, who have wrote of it, and boasted of their Excellency in this Art, were never able to give it those due Encomiums which are proportionable to the great advantages we find in it: wherefore I shall stick close to my Subject, and I dare say that if these new Anatomists, who have made such great and wonderful discoveries, had made a due and just application of them to the Art of Surgery, and if those great Practitioners, had enrich'd it with their Observations, we should have found such advantages, which will never be unless they change their Principles: But the Subject being so thorny and difficult, we find very few, who are willing to communicate to us their  
Ideas,

Ideas, and particular Discoveries. Most do but treat of these matters superficially, and without diving into the bottom, which is the reason that oft-times we cast the difficulty of the Art, upon the evil disposition of the subject: I acknowledge that it's very hard to hit always right, because Nature is often various in her motions, and works in such hidden corners, and by ways so little known, that she destroys by some unexpected stroke (which we do not foresee) the whole Oeconomy of her Operations.

*It's not enough to understand the practice of Chirurgical Operations by halves.*

It's not sufficient to undertake one Operation only, we must have a perfect knowledge of the subject on which we are to exercise our Practice, that is to say, its Temper, Disposition, and the Part afflicted.

*What the Tempers.*

By the temper, I mean a certain disposition of parts, that consists in the order of these resorts or springs which compose them, and in the figure of their Pores, proportionable to the nature of those liquors which pass thro' them, and of their motion, sometimes more, sometimes less rapid.

The

The disposition of our bodies relates to the regimen of life, Inclination, Age, Season, Habit, and Strength; for if an indisposed person observe an irregular way of living, if he be of a spare body, void of strength, if his age obstruct the performance of the Operation, or in fine if he has a greater tendency to that which is contrary and hurtful to him, than to what will be profitable and advantageous, in this case the Surgeon ought to suspend his Judgment, least he should run the risque of doing the indispos'd person more harm than good.

Touching the part which suffers, *Part affected.* the Operator must perfectly understand its natural Constitution, Connection, Action, and Use, in case he designs to draw any advantage from his Undertakings, and prevent the emergent Symptoms usual in these occasions. If the Operation may be delayed, 'tis convenient to expect a favourable Season, as for example, the Spring and Autumn.

In the Spring the Blood and Spirits (which the cold had driven towards the Centre) exalt themselves to

*Nature of the Spring.*

to the Surface, and with a greater heat revive the parts which before were as if benum'd, and without life, they are in a Fermentation, soft, natural, and by consequence capable of all the good effects which can be expected.

But on the contrary in Winter the cold obstructs the Pores, hinders Transpiration, changes the Oeconomy of the Circulation, and the Blood is deprived of that vivacity which is capable to animate our bodies.

*Nature of  
the Autumn*

In the Autumn, the Action of the Salt and Sulphur which had seized the upper Parts, and which were in a continual exaltation (during the excessive heat of Summer) is a little repress'd; the Blood (which had got a sharp and bilious disposition, by an immoderate heat) sweetens and allays the extraordinary Effervescence, which was the occasion of a continual loss of Spirits.

These are (as I conceive) the chief Maxims which are to be observed before we enter upon the particular of every Operation.

I could enlarge my self more upon the Operations in general, but as  
such

such long discourses don't clear the difficulties which they contain, and according to the Order which I have propos'd my self, to publish nothing to the World, which is not worthy the attention of the Reader, I conceived I might be excus'd from producing the troublesome Definitions, Divisions, and Subdivisions, which make up the Principal Ornament of the greatest part of Chyrurgical Authors.

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## C H A P. II.

*Of the Reunion of Wounds.*

**A**Ccording to the order of this Treatise, we begin with the Sutures, which are only practis'd to reunite the divided Parts, but first we must say something concerning Reunion; to be inform'd after what manner its done, we must observe two things.

The first is, that the Reunion of the divided Parts is only the Work of Nature, who on this occasion makes use of her natural Balm.

The

*Union of  
Parts divi-  
ded the  
work of  
Nature.*

*Three  
Means  
to be us'd  
towards  
the Union  
of wounds.*

The second, That all the Surgeons Art doth nothing for this Reunion, but as he is the imitator of Nature, he must, to second her designs, and to procure the Union of Wounds, use three means. *First*, To cleanse the Wounds exactly, and free them from all extraneous bodies. *Second*, To bring the Lips together, and *Third*, To keep them in the same situation; for to satisfy these three Intentions, a Surgeon must be inform'd of the Structure of the Parts, and of the Nature of the nourishing Juices which entertain them.

*The Body only a heap of  
Fibres, Vesicles  
and Vessels.*

As for the first, its necessary to know that all the parts of our body, are only a heap of Fibres, Vesicles, and Vessels; but because the different ranks they keep disposes in every one of them Spaces and Pores of different figures, the nourishing Particles of Blood must needs accommodate themselves differently, according to the various configurations of the Pores, and Conduits through which they pass.

*\* Blood the  
common  
matter of  
nourish-  
ment, yet  
not the red  
part, but  
white.*

\* In consideration of the nourishing Juice, one must imagine that the Blood which is the common mat-

ter

matter of it, contains an homogeneous liquor, and though it appears to our eyes under the form of two substances, notwithstanding it's certain that all the parts are nourished by its white and chilous part, and not at all by the red, if we conceive that this white part is sweet, balsamick, glewy, and viscos, which are all the requisite and necessary conditions for their entertainment ; from whence we may conclude that its the Balsam, and true Cement of all the Reunions which are made in Nature.

It would be hard to understand how this nourishing Juyce whose substance is Homogeneal, can be employ'd to the maintaining so great a number of different parts, if by what we have said of their Structure, we did not conceive that this juyce tho' indifferent, can easily become Flesh, an Artery, Membrane, Bone, Tendon, &c. according as its modified passing thro' the insensible Channels (which must be regarded as so many little threads) where it's shap'd and fram'd differently according to the Configuration of their Porosities ; just as the parts of the  
sap,

sap, which are confounded, and as it were indeterminated in the earth, take a form and determinate figure on them, passing through the different Pores of the Fibres which compose the Plants, as round, pointed, square, &c. this diversity of Figures is the cause that those Particles can produce quite contrary Effects, as well in Plants as in Animals.

This being suppos'd and well understood, I say that the Surgeons Science (whether in the Reunion, in losses of substance, or finally in what occasion soever) serves for nothing but to Rectifie this Sap, by the way of general Medicines (when 'tis corrupted;) and Topics, which have the vertue of conserving the natural Purity of the nourishing Juyce, which the Arteries carry to the offended Part, and to defend it in the same time from the impressions of the Air; therefore the Traumaticks, Sarcoticks, Carminatives, and Astringents, which Surgeons use in the beginning, Progress, State, and declination of wounds do produce such effects as I shall prove in explaining their vertues.

Vulner-

Vulneraries are ordinarily charg'd with oily and salt Particles, which cause two good effects. *First*, The oily Particles unite and adjust themselves easily to the viscous, and nourishing Particles of the blood, and make together a kind of covert which resists the powerful attacks of the Air, which is a great enemy to Wounds. *Secondly*, The saline Particles divide, cut, and attenuate such parts which are most disposed to alteration, and help them forwards in suppuration.

The Sarcoticks and Carminatives (which only differ *secundum majus & minus*) do always abound in fine saltish Sulphur, and fixt desiccative alcalies; the saltish and most rarified Sulphur subtilizes and purifies the nourishing Particles, and maintains them in their natural Motion, and consequently in their state of goodness; whilst the fixt Alcalies, and other desiccative Particles repel by a sort of caustick vertue, the most sharp and malign Particles capable of producing a bad pus, and begetting fungous flesh: the most exalted sharp Particles being absorbed,

the

*The Virtues  
of Trauma-  
tick Medi-  
cines.*

*Sarcoticks  
and Carmi-  
natives.*

*Of Astringents.*

*Too Astringents make Scars deformed.*

the flesh keeps united firm and red. Concerning Astringent Remedies, 'tis proper to give a reason why Scars oftentimes are so deformed; this depends almost commonly on the Surgeon, either because he has not skill enough to make the Fibres answer one another; or else he compresses the Wound too rudely in searching for the strange Bodies, or because he sinks the Fibres of the Parts, (of which some tend upwards; other downwards) in their intercussading one another, so that the two lips of the wound, can never be exactly even; or finally because he makes use of too Astringent Remedies; all these contribute to make the Cicatrix defective, but particularly Styptick Medicines, because being filled with fixt Alcaline, or Vitriolick Particles, the fixt ones stop the Pores, and the Vitriolick burn and cauterize them, and take away even some of the substance: This in general is the Idea one must have of the effect of these Medicines.

I pass now to the Reunion of the Tendons, which the Ancients and most part of our Moderns had abandoned,

abandoned, and which in imitation of them would have been neglected, if late Mr. *BIENAISE* (to whom we are obliged for it) had not renew'd it. In effect there's no more danger in practising the Suture of a Tendon than in that of a flesh wound; if we consider that the Liquor which runs into its Channels, is no way differing from that which passes into the Belly of the Muscle, why should it not be allow'd that the cut Tendon unites as well together as a Muscle? and since the same juyce runs into the Bones, to serve them for their nourishment, and is the true bond, and cement which reunites them when broke, why will not they allow that it should produce the same effects in respect of the Tendons which are continuous to them? Don't we even observe in Plants when we put the Graff on a wild Stock, that the Sap passes from the Porosities of the Longitudinal Fibres of the Stock to those of the Graff, that its saltish and glewy Particles stop and fix themselves at every circuit about the union as well by the motion and action of the subtil, and ethereous matter,

*Sutures of  
the Tendons  
to be pra-  
ctised.*

*A parallel  
Comparison.*

*An Experiment.*

as by encountering the external Air, and frame a Callous like that which is made in broken bones? Likewise put in six Graffs of different kinds in the same Stock, you will have the pleasure to see them bear Fruits of as different kinds, which cannot be explain'd without saying that the Juyces, which pass through the Roots, and Trunk of the Stock, have not yet any determinate Figure, but that they receive one passing through the Pores of each Graff; this is an experiment which I relate by the by, because it fortifies the System which I have establisht concerning the Reunion.

*Cause of the inequality of the Callous.*

As for the inequality which remains at the Union, after the Formation of the Callous, 'tis not difficult to conceive that it proceeds from the too great abundance of salts which rise up to the Surface, where they are stopt and fixt by the action of the external Air, as we have remarked heretofore.

Having explain'd the principal difficulties that regard the reunion, I conceive 'tis made after this manner. After the Surgeon has cleans'd the Wound

Wound from all the grumous Blood, and other strange Bodies ; after he has exactly brought together the Lips, and endeavour'd to take all necessary care for maintaining them in the same Situation ; I say, that the Molecule of the Blood ( how indifferent, or indeterminate soever they be ) passing and repassing from one of the Lips of the Wound to the other by Pipes, which I look upon as so many little Threads, they Frame and Figure themselves differently according to the Configuration of their Pores ; it happens that by the different turns and returns of the most Glewing Particles, the most Nourishing and Balsamick ( which heat has thicken'd and hardned ) disengaging themselves from the other, rank and apply themselves to the Mouths of the little Fibrils, frame as it were a Million of little chains , Horizontally drawn from one Lip of the Wound to the other, for to tye and joyn them exactly together. After this manner I shall always explain the Reunion, Vegetation of the Particles, and Progress of Wounds, the losses of which are sometimes considerable. I pass

*How the  
Reunion of  
Wounds is  
made.*

now to the Examination of the *Sutures*, and the Circumstances which depend on them.

## C H A P. III.

*Of the Sutures.*

*Three kinds  
of Sutures  
used by the  
Ancients.*

**T**HE Ancients have Established two sorts of *Sutures*, the one of separate Points, which they call'd *Incarnative*; and the other of continuous Points, call'd *Restrictive*; they have also spoken of a kind of *Conservative Suture*, which they used in great Wounds to avoid deformity.

*Five kinds  
of Incarna-  
tive Su-  
tures.*

There be five kinds of *Incarnative Sutures*. 1. The interfected or interrupted. 2. The Quill'd or Spiral. 3. The twisted. 4. Hookt. And, 5. The dry *Suture*.

*Five kinds  
of Restrictive  
Sutures.*

The *Tanners*, *Shoemakers*, *Taylor's* Stitch, and from without inwards, and that of *Celsus* which is made a cross, are the five kinds of *Sutures*, which Antiquity has described to us under the name of *Restrictive*; but without insisting on the description of these last, because absolutely useless,

less, I pass to those which are in use, *Three sorts of Sutures most in use.*  
*viz.* The Interrupted, Quill'd, and  
 Twisted, the last being used in the  
*Hare Lip*, the quill'd in deep *Wounds*,  
 and the Interrupted in all others.

'Tis not enough to entertain you  
 with the *Sutures*, I am also obliged to  
 make you remark all the circumstan-  
 ces which accompany them, after I  
 have given you the most perfect *Idea*  
 that I possibly can of *Wounds*, to  
 which they are convenient, and to  
 which not.

The *Wounds* where ordinarily *Su-* *Where Su-*  
*tures* are Practised, are Angular, *tures are to*  
 Transverse, Oblique, in a word, e- *be used.*  
 very where the Bandage can't make  
 the Reunion.

The *Wounds* in which *Sutures* are *Where no*  
 rejected, are those alter'd by the Air. *first in al-*  
 I will propose my conjectures about *tered*  
 its Malign Action in such *Wounds.* *wounds.*

I say, that the Air is a fluid and *The malign*  
 transparent Matter, full of Saline *Quality of*  
*Nitre*, whose Particles are Branch'd *Air in*  
 and Irregular; this being supposed *wounds.*  
 'tis easie to draw some consequences  
 concerning the manner how it Com-  
 municates its evil Qualities to wounds,  
 and how its capable to alter the Na-

ture of the Blood; which is not hard to conceive, if we consider that it Rusts, not only *Iron* and *Copper*, &c. but also corrupts even the most solid Bodies.

*How the  
Air destroys  
the Tone of  
wounded  
Parts.*

I consider the Humidity of the Air, and the *Nitre* with which it's loaded, as two great Agents, which have the power to consume and destroy the most Oily Portion of the Nutritive Juice of the Parts, so that the Oyl of the Blood, which is the true Balm that Nature makes use of to Re-unite Wounds, and keep the Vessels supple, being dissipated by the Humidity of the Air, and action of the nitrous Salts which are dispersed in it, the *Fibres* dry up, and the *Pores* contract, which occasions very frequent and dangerous Obstructions; the Salts thus having got the upper Hand, and united themselves with those Salts, which result from the consummation of the Oleaginous Particles, that serve them as a Vehicle, change into a *Vitriolic* and *Arsenical* Matter, that gnaws, cuts, and corrodes the Vessels; of this mixture arises a kind of *Verdigrise* (almost like that we see on *Copper*) after the Action of this powerful

erful Enemy of Bodies ; so that if one does not defend the Wounds from its Ravage, it happens that the Obstruction and Inflammation encrease more and more; which occasions *Fevers*, and gives way for a *Gangreen* to seize the Part.

The *Sutures* are not convenient in Contus'd Wounds, because there is extravasated Blood between the *Fibres* and *Vesicles*; which must needs turn to Pus ; we want no other indication to shew us that we must give it vent by way of Suppuration, and so consequently the *Suture* would be very dangerous.

2.  
*Sutures not convenient in contused wounds.*

I say also, that *Sutures* are not used in Wounds, where there is great loss of Substance, as in Gun shot, or in those whose Lips the Surgeon cannot bring together.

3.  
*Where there's loss of Substance.*

Nor are *Sutures* made in Bites of of Venomous Animals: For without doubt their Poyson presently Irritates the Spirits which ascend to the Brain, and infects the whole Mass of Blood, which must presently be Remedied by the help of *Cardiacs*, and *Corroboratives*, after having apply'd to the Wound strong Resolutives, as *Theriaca*

4.  
*Nor in Bites of Venomous Animals.*

dissolved in Spirit *Vini*, and other Medicines of the same Nature.

5.  
Nor in  
great In-  
flammations.

They are also rejected in great Inflammations, the understanding of which suffers no difficulty, since the Obstruction precedes always the Inflammation; 'tis necessary that the Matter which is stop'd, and out of its Vessels, be Evacuated.

6.  
Nor where  
large Vessels  
are  
wounded.

They are of no use, where considerable Vessels are open'd, because the Blood which flows from them, the Bandage which one is obliged to make, and the Astringents, which are strange Bodies, oppose the reunion.

7.  
Nor in  
wounds of  
the Thorax.

They must also be avoided in Wounds of the *Thorax*, as well superficial as deep, because of the frequent Motions contrary to union, for the Breast being forc'd to dilate and contract, the Muscles and Cutis making an effort in assisting the Elevation and Dilatation of it, would burst and be torn, because of the resistance which the *Sutures* make, which would excite Inflammation, Pain, and difficulty of respiration.

8.  
In discovered  
Bones  
according to  
the Ancients.

Finally, the Ancients have added, that we must not use them in Places where the Bones are discovered, because

cause of Exfoliation, but as there is nothing that alters more the texture of the Bones, and Facilitates more quickly Exfoliation than the Appulse of the Air, we must not question to shelter them by the help of the *Sutures*, having a due regard to the Contusions and Fractures which often happen to the Bones. However, be it as it will, we hazard nothing, because, if the Accidents should be urgent, we have nothing to do but to cut the Threads; so that one may without danger use *Sutures* in Wounds of the Head which penetrate even to the Bone; unless they be in the furthestmost part of the Coronal Bone, or behind the Head, or in a direct Line, then we may use an uniting Bandage: This being known and explain'd, we must speak now of the circumstances which accompany the *Sutures* that we Practise: They consist in chusing Needles proportionable to the Nature of the Wounds, *E. Gr.* if they be great and deep, you must use a crooked, flat, and very sharp Needle; the Thread must be single or double according to the force 'tis to resist. In all sorts of Wounds, the Fingers are

*Choice of  
Needles.*

*The manner  
of perform-  
ing the Su-  
tures..*

more convenient than the Canula. Having taken all these precautions, and freed the Wounds from all Extraneous Bodies, a Servant must bring the Lips together, and the Surgeon with a Needle arm'd with wax'd Thread, pierce them in a strait Line from without, inwards, and from within, outwards, making as many Stitches as convenient. You must pierce deep enough into the Flesh, because for want of penetrating, you may leave some space in the Bottom of the Wound, where some Blood may be spilt, which wou'd hinder union.

*An Objection  
on Answered.*

I am not of their Opinion, who recommend in the Practice of Sutures to take more of the upper than the under Lip, because (say they) the strength of a Muscle is much more considerable towards its Origin than insertion; but they don't consider in the sensible Action of a Muscle, that when the tendon of the Origin obeys, and is relaxt, that of the Insertion is much brac'd and bended, so much more subject to be broken, if it suffers any Convulsions in some part, from whence I conclude, that if you were to take more  
of

of one Lip of the Wound ( which we suppose to be in the Belly of the Muscle ) than the other, it wou'd be much better to do so on that which regards the Insertion. But without insisting on a thing of so little consequence, I suppose it no way necessary to engage one side more than another.

Finally, all the Threads being past, you must begin to tye that in the middle , making presently a single knot, on the firmest side, and where the matter is least apt to run ; over that, apply a little compress of Linnen, on which make another knot, which I believe more useful than the Surgeon's knot (which only consists in twice passing the Thread through the same knot) because if any Accident should happen, it could be more easily united, then make a slip knot, and so of the rest.

If the Wounds are superficial, a strait Needle will serve ; single Thread, and your Fingers, observing always the forementioned circumstances. Thread is to be preferr'd *Thread better than Silk.* before Silk , because this cuts the Flesh.

If the Wound has but one Angle, you must begin at it, if two, begin in the more solid part; if three or four, begin always by the Angles with little Compresses, or Bolsters. The Balms, and Bandages are at the Surgeons discretion. If you apply an Emplaster, you must lay little Compresses on the knots, lest you move them in taking off the dressing.

*How to cut  
and draw  
out the  
Thread.*

If there happen any troublesome Accidents, loose the knots without any violence, so that you may tie them again when the Accidents cease; but if there should happen any considerable Inflammation, so that we should be forc'd to cut them, you must introduce your Probe under them, on which you must cut the Thread: (We do so, when We find the Reunion is made, and that we are about to undo the Stitch with Dexterity) then lay your Finger next the knot, and draw the Thread softly out, for fear you renew the Wound.

*In what  
part the  
Quill'd  
Stitch is  
most used.*

These are the principle circumstances which must be observed in performing the interrupted Stitch: I pass to the Spiral or Quill'd, which differs from the other, only in the manner

manner of disposing the Threads. We use it for the most part in deep Wounds, which happen to the great Muscles of the Buttocks, and Thighs, tho' perhaps if well examin'd inferior to the interrupted : but seeing it may be useful, and has in all times been esteemed so; I shall now describe how it is performed.

The Surgeon must take a crooked Needle, Arm'd with a wax'd Thread, the two ends of which must pass together through the Eye of the Needle, that there remain a sort of Loop, having pass'd it through the Flesh, you must so dispose two or three of them, according to the length of the Wound, in which you must put some pegs of Wood, arm'd with Lint, some strong Tents of Lint, or a Quill, which must be Rankt all along the extremity of the Lips, which have been brought together by a Servant, who holds them while the Surgeon makes the knots upon the Tents; &c. as has been said, except that we put no Compress on them.

There's one kind of Quill'd Suture, where you can cut the Threads and make the knots on both sides.

The

The Twisted Stitch is only made in a *Hair-Lip*, it consists in disposing the Thread, cross about the Needle, as shall be describ'd in the Operation.

*like dry  
Stitch, not  
very useful.* Some put the dry Stitch among those that are in use: But, besides that, this *Suture* is only fit for Cutaneous Wounds, and is often subject to come off, I find it useless, not only because of the Humidity which loosens it, but also because 'tis not capable of making an exact Union.

*How the  
Stitch  
made.* But they that would make use of it, have nothing to do, but to take two pieces of new Linnen with their Selvage, cut in several Angles, or Indented more or less, according to the length of the Wound; at the Extremities of which, tie some little Fillets, then dip the Clothes in some Agglutinative Medicine, applying them in such a manner, that the Angles may be a little distant from the edges of the Wound, about half a Fingers breadth, to facilitate the Union more commodiously.

## C H A P. IV.

*Of the Suture of the Tendons.*

**T**O make an end of the *Sutures*, I come to shew how that of the *Tendons* is performed: But before I begin, 'tis necessary to explain the Symptoms which ordinarily accompany its Wounds. In these kind of Accidents, the *Tendon* is wholly cut, or in part only, if the former, 'tis evident that the Symptoms are not so bad, and that it suffers neither Tension, Tumor, nor Fluxion, but withdraws somewhat into the Flesh, and increases a little in thickness: But if the latter, the Symptoms are very dangerous, because the *Fibres* that remain destitute of their wonted assistants, must of necessity be broken and torn in the sensible Contraction of the Muscles, or at least suffer such violent tensions, that cruel Accidents speedily arise; besides that, the Blood spilt, in the Intervals of the *Fibres*, does Ferment the Saline Particles, and working upon the Tendinous *Fibres* divide them,

*Accidents  
attending  
wounded  
Tendons.*

them, on which follows sharp Pain, *Convulsion*, *Syncope*, *Vomiting*, *Diarrhæa*, *Fever*, *Coma*, and often *Gangreen*, if the rest of the *Tendon* be not speedily cut.

*Case of Pain.*

The Pain is not excited, but by the continual *Divulsion* of the little insensible *Fibrils*, like that which one feels sometime after the cut of a *Sword*, this does not proceed from the first division, but by those which are made through the action of the sharp and extravasated Humours, so that as often as the Animal feels pain; there are some divisions made, by which means the Soul (which watches and interests it self in the conservation of the parts of our Bodies) is afflicted.

*No Pain without Solution of continuity.*

*The cause of Convulsions.*

These sharp Humours, coming to shake vigorously the little Filaments of the *Nerves*, cause the Spirits to run irregularly into the Muscles, which excites the *Convulsion*.

*And of Syncope.*

The Spirits being put to flight, instead of running into the *Fibres* of the Heart, and ruling their motion, are carried in disorder, sometimes to one part, sometimes to another; the Heart being deprived of the influx of the Spirits, which are the true Instruments

struments of its ordinary motion, and being no more capable of contraction, the course of the Blood must be suspended for some moments, from whence comes *Syncope*.

But as soon as they retake their course, they double their Action, and are Lanch'd with so great Precipitation into the Fleshy *Fibres* of the Stomach, through the familiar commerce and mutual consent between the Cardiac *Nerves* and those of the Stomach, that they oblige it to discharge it self of all that's in it, which is call'd *Vomiting*. And of Vomiting.

The *Ventricle* with its powerful and repeated Contraction, passes so hard the Bladder of *Gall*, and the Neighbouring Bilous and Pancreatic Ducts, that it squeezes out their Juices into the Cavity of the *Guts*, which presently causes a *Diarrhœa*. And Diarrhœa.

These two Liquors being thus press'd out of their Vessels, without having received all the preparations and alterations which are necessary for them; fail not to make the *Chyle* Acid, with mixing themselves in the Intestines, they serve for Leven, and Ferment to corrupt and produce a *Fever*. The cause of a Fever.

The

*Of heaviness of the Head, and failure of the Senses.*

The Blood being in Fermentation, mounts with such an impetuosity to the Brain, that the Sinews thereof which receive all the rest of the Blood of the Interior Head, cannot discharge proportionably so much Blood into the Jugulars as the Arteries furnish, by reason of the slowness of Circulation in these Sinews; so that the *Nerves* which come from the base of the Skull, to be distributed to the Organs of the Senses, are a little compressed by the weight of the Blood, which causes heaviness of the Head, and that the Senses don't receive the impressions of their Objects with the same facility as before, through the Obstacle that the Spirits find in their passage.

*How to prevent those ill Accidents.*

To prevent all these Accidents, you have nothing to do but to cut the rest of the *Tendon*, if the major part be divided, but if the loss of the *Fibres* be not so considerable, and the Symptoms not so pressing, you must do nothing rashly. If you perform the Operation, you must Stitch the *Tendon*, rather than cut it, so that the Surgeons intention is to Reunite the two Extremities by *Suture*.

if

If it happen that the Extremity of one part be so far shrunk into the Flesh, that it cannot be brought to the other by the Forceps, it would be convenient to molifie the *Fibres* a little with some Oyls extracted without Fire, as *Ol. Amygd. Dul. Ovor. Cerae*, &c. which are proper to relax the *Fibres*, and facilitate their Union; for if the Oyl be Extracted without Fire, the heat does not so soon dissipate their Viscosity, which is the true Cement; besides, they are more capable of tempering the Acid of the Blood, and of appeasing pain.

The *Tendons* being molified, you must Stitch if you can, and seeing they are Compos'd of little *Fibres*, you must take half the breadth of a Finger upon the Body of the *Tendon*, that the Stich may better resist the motions of the part, and the flowing of the Matter. If the *Tendon* be not discover'd enough, you must try to make the *Suture*, without unflashing it, because the Flesh secures it from all alterations.

After the Surgeon has put the part in a convenient Situation, a Servant must uphold one Extremity with the For-

*How to perform the Operation.*

Forceps, whilst the Surgeon with his left Hand holds the other, and with a *Grain Needle*, arm'd with double wax'd Thread knotted at the end, pierces them from without, inwards, and from within, outwards, bringing them exactly together; then lay away your Needle, and take a little compress of Cloth with two holes in it, to pass the two ends of the Thread through, and make a single knot, over, which apply another little Compress, which you fasten with the Surgeons knot, and slip knot; you must observe to wet the Compresses in some Spiritous Liquor, and put some wax-Candle on the knot instead of Lint.

*Unctuous  
Medicines  
not proper.*

The *Suture* being made, you must humect the first Day with some Oyle and Spirit of Wine, the following days we use a Balsam made of *Tereb. Tinct. Aloes*, or that of the *Tinct. Flor. Hyperici*, the use of Oyls, or Fats, are here to be rejected, because they Putrifie the *Tendons*: In the beginning *Cataplasms* made of the four Meals, Wine, the Yolk of an Egg, and Hony, are very proper: It must be observed, that as soon as Suppuration is made, 'tis evident, that the *Tendon* begins to be

be united; most good Practitioners  
Commend in long Suppurations to  
make use of Spirits, on bared *Tendons*,  
& *Emplas. Andreae à cruce.*

## CHAP. V.

### *Of the Hair-Lip.*

**I**F *Sutures* have any use in perform- *VVhy so*  
ing Operations, 'tis doubtless in *called.*  
the Union of the *Hair Lip*, so call'd,  
because this Animal has naturally the  
Upper-Lip slit. This Malady comes  
sometimes from an imperfect Con-  
formation, and sometimes by Acci-  
dent, *viz.* it may be caused by some  
Blow, Fall, or other like mischance,  
if the Reunion be then neglected, it's  
to be fear'd, least the edges grow Cal-  
lous, and at length a true *Hair Lip* is  
form'd.

'Tis very often an Hereditary De-  
formity, which we keep as long as  
we live, unless we are willing to suf-  
fer the Operation; however, its cure  
cannot be accomplish'd but by *Suture*:  
If there be great loss of substance you  
must not hazard the Operation, be-  
cause

cause the *Cutis* wou'd be so much extended, that it wou'd be very hard to Pronounce well certain Words, and to make with care all the other motions which this part is capable of, those which happens to the Under-Lip are of difficult cure, because the Defluxions are more frequent, and the Lip always humected with many ferosities.

*Where cutting Hair-Lips wou'd be useles.*

There are several other occasions where the Operation wou'd be useles, as in Children, by reason of their continual Crying, in the old Scorbutick and Pox'd, in irregular Women, and in several other vitiated and indisposed Subjects, in which the Blood is only a serous Mass, sharp and Corrosive, having lost all its consistence and unctuosity, and consequently incapable of Reunion: You must have regard to some of these circumstances in all other *Sutures*; therefore the Union of the *Hair-Lip* is not to be undertaken, but in adult Persons, who have no other incommodity, and are willing to endure pain.

*How 'tis to be performed.*

To perform this Methodically, you must cut a little Filament which fastens the Upper-Lip to the Gums,  
to

to give liberty to embrace with your Instrument the whole breadth of the *Hair-Lip*. 'Tis a particular pair of Pincers with which you must engage the Lip, towards the corner of the Mouth, and let it slip to the Extremity of the slit, you must secure and fasten it with a Ring, to have the liberty of refreshing and cutting Dexterosly the Superfices; afterwards, you must unbridle the Upper part for fear there may remain a little swelling, which would be as disagreeable as the Deformity it self; so that after the two Lips of the Wound have been exactly brought together, and that they are in a just level, you must pass from one Lip to another, one or two Needles arm'd with wax'd Thread, according to the length of the *Hair Lip*, and cross the Thread about the Needles as is convenient; you must break off the points, and lay some little Compresses underneath, that they mayn't prick the Patient, then apply a little Pledgit wet in some Balm, or Styprick Liquor, and Embrocate with *Ol. Rosar.* with a Compress dipt in *Oxyerate.* and a little Band, or the fourfold Bandage.

You

You must not imitate certain Operators, who Scarifie to no purpose, the sides of the Wound, to disengage the part which always suffers some Tension, since we can remedy this inconvenience, by laying on the Cheeks some Compresses sustain'd by the Bandage; you must order the Sick a very exact Diet, which consists in using the first three or four Days nothing but Liquids, and avoiding all sorts of motion.

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## C H A P. VI.

*Of the Gastroraphia.*

**O**F all parts of the Body, there's none more subject to Maladies than the Belly, and that consequently has more need of the Surgeons assistance.

The Operations which are Practised there, depend from the Wounds that happen to it, from the Tumours called *Hernias*, from Laborious Child-birth, from Dropsies, Fistula's, and Abscesses.

The

The Wounds of the Belly, are either big or little, Superficial or Penetrating, are made with or without the hurt of the contain'd Parts, which very often come out of the Cavity, according to their indisposition; greatness of the Wound, more or less motion as we are going to explain.

We conjecture there is some part damag'd according to the Figure of the Instrument wounding; you may judge what Parts are hurt by the Situation of the Wound, and by that in which the Patient was when received.

But the true Signs which indicate the division of some Internal Parts, are acute Pains, *Inflammation*, Fever, or some Matter coming forth; nevertheless, all these Signs are equivocal, except the least, which is known by the Colour, Smell, and consistence of the Matter, which is discharg'd out of the Wound, or flows in the Cavity of the Belly.

*Signs of the wounded Viscera.*

But as the most of these parts are floating and always Relax'd, they get out of their Cavity at the least impression, or disorder, particularly at the time of expiration, when the *Thorax* contracts: Though it seems that they

*After what manner the Viscera get out of the Belly.*

they should rather escape in the inspiration when the Diaphragm is level'd, pushing back, as the Antagonist of the Muscles of the lower Belly, all the parts that are under it, yet its certain that the Muscles of the lower Belly oblige them against their natural motion and inclination, to come out of the Wound in time of expiration, when they press all the containing parts of the Belly : This being so, 'tis evident that it's necessary for the part, that is under the Muscle and out of Action, to regurgitate and shew it self out of the Wound, as a piece of Paste does between the Fingers, when squeez'd with the Hand, whereof depend those frequent Strangulations, and dangerous Inflammations.

You must also remark, that these parts are extream spongy and greezy, whose Texture is very loose, humected with a quantity of Humours, bedew'd with an infinite number of Vessels, and consequently very subject to Putrefaction, for the Air coming to strike and penetrate their Substances, they fail not to Tumesce and Condense the Blood which animates them,

them, if they be too long expos'd to it: These Parts being therefore depriv'd of the motion of the Blood, in which consists their Heat and Life, there must needs happen a mortification.

Besides the action of the Air, we know that Inflammation is capable of causing the strangulation and mortification: It's easie to conceive that the parts being inflam'd and swell'd must take up more room than before, and press the Intestine and Omentum, which is commonly found in the passage, from which must follow interruption of the course of the Blood and Spirits in those parts, and consequently Gangreens. It often happens that the Intestine is inflated, the cause of which proceeds from the Inflammation, which the Wound communicates to the Gut, and the Air obstructs the Pores; besides, the return of the Venal Blood, is in a manner stop't by the Strangulation, and the little motion which is to be seen there.

*Cause of the  
Inflation of  
the Intesti-*

The Inflammation which attacks the Gut, is capable of Rarifying a part of the Serosity, ( and the other Juyces which are contain'd there, whose motion is made more slow ) not being able to escape, by reason of the Air

C

which

which stops all the passages, and shuts the Pores of the Intestine, so that 'tis impossible for the Surgeon to reduce them without dilating the Wound.

*How to Dilate when too narrow.*

To perform which, the Surgeon must pass a hollow Probe between the lip of the Wound and Intestine, and slip a Bistoury all along the hollow of the Probe; but before he makes the Incision, it will be convenient to examine whether the Gut be not engaged, lest he wound it: This being known, he may boldly dilate the Wound, and cut as much off the Peritonæum as of the Muscles, &c. because the Strangulation is every where equal, against their Opinion who pretend 'tis more considerable without, than within. I shan't here speak of the precautions which the Ancients took, in applying Fomentations, and several other Medicines: But suppose it necessary to Foment, and warm the parts with hot Clothes, or with Wine.

*If the Omentum be altered, cut off the mortified part.*

Before you reduce them, you must examine whether they be'n't hurt, and if the Omentum be not mortified, which is known by its Lividity, then without delay, cut off the Gangreen'd part,

Chap. 6. *Of the Gastroraphia.*

41

part, after having made the Ligature of that which is found.

If there be a little Wound in the Intestine, it requires no Suture; if it's big, use the interrupted, for the *Skinner's* Stitch is not approv'd of.

In my Opinion, there's nothing that sooner cures the wounds of the Guts, and procures quicker union, than a true and exact Diet; and I find nothing contributes more to it, than in ordering the Patient to lie on his Belly, taking care to have a kind of Bolster under the Wound, to facilitate the running out of the Matter: Every one knows, there's nothing more contrary to union, than motion: By the Diet we lessen the Action of the Intestines, and by the Situation, that of the Muscles of the Abdomen: The reason is, that in this Situation, all the parts within, lie heavy on the Peritonæum and Muscles, and so diminish part of their motion. You must Observe, that Wounds of the Guts are never Reunited, except to the Neighbouring Guts, and other nigh parts, as Peritonæum, &c. for which reason, 'tis convenient to pass a Needle arm'd with wax'd Thread under the Body of the Gut through the Mesenterium,

*In wound  
of the Bellie,  
a spare Diet  
to be us'd.*

terium, chusing a place most free from Vessels, to pull it gently towards the Peritonæum, to which it will easily adhere.

*How to reduce the Gut.*

Having observ'd these circumstances, search for that part of the Gut which is nearest the Mouth of the Wound, and reduce it with your Fore-finger into the Cavity of the Belly, and before you pull that back, introduce the other; and after this manner push it successively till in its natural place. The Ancients used to shake to the Patient, that the parts might return to their former Situation. We always leave out of the Wound a part of the Ligature of the Omentum, which we place on that side where the Matter runs least, and we make the interrupted Suture; hence come the name of *Gastroraphia*.

*How to make the Suture of the Belly.*

You must have two crooked Needles arm'd with the same Thread, then with your left Hand hold the Peritonæum, and the other integuments, and taking a Needle with your right, pass it from within, outwards, on one lip, and without lifting your Finger, pass the other on the opposite side as the first. You must make as many Stitches as are necessary, leaving some space to put a Tent

Tent in, on that side where the Matter takes its course, if there be any appearance of Suppuration, which commonly happens, if the Omentum or Intestine be any way alter'd: Having examin'd all these circumstances, you begin with the middle Stitch, and so of the rest.

The Sutures being made, you must apply a Pledgit dip'd in some Balm, or spirituous Liquor, making a light embrocation with *Ol. Ros.* and *Spirit Vin.* on the region of the Belly, then a convenient defensive sustain'd with the Napkin and Scapuler. The next day instead of using Astringents, 'tis good to use Emollient, and resolving Fomentations to hinder Tension, which is a dreadful Symptom; for the edges of the Wound endeavouring to retire, cause extream pain, and often break the Thread; therefore you must dispose it so, as to be able to straiten it after the Inflammation's over.

Emollient Clysters are of great use, not only because they relax the *Fibres*, and evacuate the Matter, but also because they refresh, and serve as a *Balneum Marie*, to calm the motion of the Blood and Spirits, and hinder the

progress of Accidents. 'Tis sufficiently known, that Bleeding and general Remedies are not to be neglected.

If the edges become Callous, digestives are wonderful, because they relax the *Fibres*, take away Obstructions, and facilitate the generation of the fleshy Vesicles, and consequently the cure of the Wound.

Concerning this Operation, 'twill not be amiss to tell you further, that a wounded Person that has a Portion of the Intestine carried away, wou'd Die intallibly, if the Surgeon by his industry does not so dispose the Gut, to let the contain'd Matter run out; that is, he must shew the Gut to the Peritonæum, and Teguments which make a kind of Anus, that gives the Excrements liberty to come forth through the Wound, unless Nature should work by its self, as it happen'd to a Soldier in the *In-valids* at *Paris*, which serves us for an Example.

C H A P. VII.

Of the Dropsie, which occasions the  
Paracentesis.

**T**HE Dropsie, as all the World knows, is a Disease, whose parts where it is made, are (as it were) overflow'd with a great quantity of Serofities. Definition.

We make ordinarily two sorts of them, the general, and particular: The particular (which we will examine after we have Explain'd the Universal) receive different names according to the parts which they attack, as the *Hydrocephalus* of the Head, *Hydrocele* of the *Scrotum*, &c. Division into general and particular.

The Universal are commonly divided into *Ascites*, *Timpanites*, and *Anasarca* General twofold.  
*vel Leucophlegmatia* we will not speak here of the *Tympanites*, since scarce ever such was seen, and it differs from *Ascites*, but *secundum majus & minus*, being always accompanied with many Serofities. I shall stick only to the *Ascites* and *Anasarca*, tho' if well examin'd, this last might be reduc'd to a kind of Universal *Ascites*, or might very In strictness but one sort of Dropsie.

rationally be comprehended under the general notion of it.

*Ascites true  
or false.*

*True.*

Ascites is true or false, the true is caused by a great quantity of Water, that fills the whole Cavity of the Belly, which swells and tumefies it to the last degree of Tension: These Waters fall often into the Scrotum, and make an Hydrocele, and when they grow sharp, and pungent, cause several troublesom Accidents, as we shall shew in the following discourse.

*False.  
Difference  
between  
false Ascites  
and Ana-  
sarca.*

The false differs from the Anasarca in this, that the last affect ordinarily the whole habit of the Body, and the other is only confin'd to the Cavity of the Belly. The Anasarca consists in the swelling of the whole Body, and the other only in one part: You must observe, that in Anasarca and false Ascites, the teguments only are alter'd, whereas the true Ascites possesses the whole capacity of the Belly: When I say the teguments are only alter'd, 'tis that you may observe, that the Body of the Muscles is not penetrated: Tho' 'tis true, the water swims on the Surface, and it's observed in the opening, those who Die of a Dropsie, that their *Fibres* are whitish, as well as the Neigh-

Neighbouring parts, because they have been too long humected with the water, but the rest are as firm and solid as those which have not been touched at all. It must also be observed, that in Anasarca, and false Ascites, the water is sweet, unsavory, and without Acrimony, for which reason, it is not so penetrating, and the Patient is without Thirst and Fever, his Urin is sweet, crude and thin; but contrariwise in true Ascites, the Urin is red, muddy and lixivious, the Patient having excessive Thirst, slow Fever and difficulty of Urin.

I shall not trouble my self to tell you the Ancients Opinion concerning the cause of the Dropsie, but suppose these four things contribute to its Formation; *viz.* 1. Indigestion of the Chyle. 2. Loose texture of the Parts. 3. Slowness of the Bloods Circulation. 4. A general dissolution of its whole Mass.

*Four chief causes of the Dropsie.*

I begin, first with Indigestion of the Chyle, which almost always proceeds from the alteration of the dissolvents that serve for the preparation, and the consummation of their Oyl and Viscosity; when the Chyle is well tem-

*1. Indigestion of the Chyle.*

per'd, prepar'd and freed from the course Particles, it's nothing but a Buttery Mass which passes into the *venæ Lactææ*, and from thence into the right Ventricle of the Heart, to be united with the Blood which comes from all parts deprived of its Oyl and most active Principles, and serves for a Vehicle and Balm for new nourishment. It is this Lactaceous Liquor well depurated and extreamly fluid, which entertains the parts, and which by its mixture unites and ties in the Heart the two substances of Blood, *viz.* the white part to the red; which substances well joyned make a whole, neither too fluid, nor solid, but such as Nature judges most proper to circulate without Obstacle in the Vessels. But if by chance, the Oyl of the Blood, and other Humours (with which it's furnish'd) should happen to be dissipated, either by violent Exercise, too serious Meditations, extream Grief, or by the abundance and exaltation of the Salts; the Chyle must of necessity grow sour, become Indigested, serous, and incapable of any Union; then it's so far from preserving the consistence of the Blood, that  
it

it rather Dissolves, Liquefies, and disposes it to make Obstructions, Rheumatisms, Dropsie, &c. Because the Arterial Blood, not being able to receive, through this Indigestion, all the preparations and triturations necessary for the Life of the parts, it's course must be in a manner intercepted, passing into the Vesicles, or rather spaces between the Porosities of the Arteries and Veins, where the little Oyl frees and disengages its self from the other Principles, which it had taken hold of before, to change into our proper Substance; so that the serosity of the Blood being at full liberty, and having lost a part of its motion, pours it self into the spaces which it meets with, and so causes the Dropsie; according to the texture of the parts, which we have supposed more or less lax.

2.  
*Loose texture of the parts.*

We must now explain that cause which proceeds from the slow Circulation of the Venal Blood. That we may have an Idea of it, we must examine by what Mechanism this Blood is carried back to the Ventricle of the Heart, which is the focus of its motion.

3.  
*Slow Circulation.*

*How the  
Venal  
Blood is  
carried to  
the Arte-  
ries.*

*1. Pulsati-  
on of the  
Arteries,  
help the  
motion of  
the Blood.*

*2. Motion  
of the Mus-  
cles.*

*3. The  
Lympha.*

I let first, omitting the Organs of respiration and the assistance of the Valves, three principal movers, which oblige the Venal Blood to pass through the Heart. 1. The Pulsation of the Arteries. 2. The Motion of the Muscles. 3. The Mixture of the Lympha. If the Pulsation of the Arteries be weakned, the motion of the Venal Blood must be lessen'd, because the Arteries beat, and actually Flagellate those Vessels, and so oblige the Blood which they contain, to repair to the Heart with a wonderful facility.

The Motion of the Muscles, is much more important to hasten the Circulation of this Liquor, they being as so many Hands which press the Vessels that penetrate or pass through them, and determine the Liquor which they contain to a quicker discharge into their Receptacles: So that if they have lost a part of their motion, for want of Spirits, the Circulation of this course Blood, wou'd be as it were suspended in the Veins.

In the third place, I said that the Lympha disposes it self in the Veins to make the Blood more fluid and fit to circulate: No 'tis certain, if its course

course be impeded, either in the Glands or Lymphatic Veſſels, the Blood wou'd circulate much ſlower, for want of a diſſolvent. This being ſuppos'd, that Indigeſtion of the Blood, ſlow and dull Pulſation of the Arteries, weak motion of the Muſcles, and interruption of the courſe of the Lympha, are cauſes which concur ſomewhat to Impede the Circulation of the Venal Blood, which is a Blood depriv'd of its Spirituous Particles, having no conſiſtence or ſtrait Union between them : Then the ſeroſity which ſerves the reſt of the Blood as a Matrix, ſeparates it ſelf from it, as the ſeroſities of Milk from the Curd; it tranſpires between the intervals of the *Fibres*, or pours it ſelf out as a gentle Rain in ſome capacity, for to frame both kinds of Dropſies.

*The Venal Blood very poor.*

Two Experiments confirm me in this Opinion. The firſt is, That if we make the Ligature of the Veins in ſome part, and that one hinders the paſſage of the Blood, it does not fail to be overflown in a ſhort time.

The ſecond is, we obſerve, That moſt big Bellied Women have Hydropick Legs, or at leaſt Varices: This is Leggs.

*Big Bellied Women ſubjeſt to Hydropical Leggs.*

is a Matter of Fact, not to be diſputed, and which is eaſily explain'd, only by the diſpoſition of the parts; we obſerve, that as the *Fœtus* grows bigger, it enlarges the Matrix, and comprefſes ſo much the Iliac and crurel Veins which are near, that the Blood which comes from the inferior parts, not having the liberty to move as it uſ'd to do, by reaſon of this comprefſion, there muſt a Dropſie follow, as we have ſhewn.

*Diſſolution  
of the Blood.*

What belongs to the cauſe of the Dropſie, which proceeds from the diſſolution of the Blood, we have already remark'd, when we ſpoke of Indigeſtion of the Chyle, that nothing is ſo capable of deſtroying and conſuming the Oyl of the Blood, as the abundance and exaltations of the ſharp and tartarous Salts. It's by the means of their action, that we explain how Scorbutick, Hypochondriac, Lienteric Perſons, and thoſe who lie long in Priſons, become Hydropical: Which we cou'd not eaſily demonſtrate, if we did not admit the motion, and agitation of the cutting, and Corroſive Particles, which puts the principles of the Blood to the rout, and diſunites them

them, so that the Sarum escapes on all sides, and gives way for the Dropsie to seize on some part; whether it transpires in form of a Dew through the Tunicles and Membranes, or Filters between their *Fibres*, or the Glands let it escape, or it's spilt by the interruption of its most insensible Vessels, in the void spaces which present themselves at their passage: It will always be truly said, that the parts which Nature has a mind to attack, are in a very little time Drown'd. We observe that the Muscles of all Hypochondriacs are deprived of a part of the Spirits which are necessary to them for their natural motion; for if we consider, that the Sulphur which we have supposed to be destroyed, contributes only to the generation of the Anima Spirits; that the little cutting Particles which this Sulphur wraps up, are the Matter of them, and the residue, the Vehicle and true Oyl, with which the Brain is imbued; we shall agree that the Glands of the Brain furnish very few Spirits in these Diseas'd Persons, whose Bodies are depriv'd of Fat, and that consequently their Muscles must lose of their force, vigour, and motion; from

*What the  
Animal  
Spirits are.*

from whence comes the great heaviness which they feel. You must also observe, that they are no more provided with this Fat, which before made their *Fibres* supple, flexible, and capable of activity: This being so, 'tis evident that their motion must be weakned, that they can no more communicate any to the Vessels; the course of the Liquors must be slackned, and the Animal Spirits which bring some formality to every part, are no more in a condition to keep the Pores open, or at least so wide as ordinarily, so the Vessels being as it were sunk, and the Arterial Blood not having any more the power or strength to make it's way, the parts are almost defrauded of Life.

*Old Men  
very subject  
to the Drop-  
sie.*

I alledge all these reasons, because they fortifie our System of the formation of the Dropsie, which is founded on the slowness of the Circulation of the Blood; which is remarkable in old Men, who are most subject to Dropsies: The reason is, because their Blood is only a fluid Indigested and corrupt Mass, having lost all its consistence and unctuosity; one may say, it has lost its Oyl, and consequently

is made incapable of sustaining its Fermentation. I add, that those who Inhabit Boggy places, being of a cold Temperament and used to moist Food, will be more liable to it, than others.

The Dropsie, which often effects Fat and full People, who, nevertheless, are in a certain moderate repose, has for its cause only the slowness of Circulation, through the frequent Obstructions which ordinarily happen in the Glands, and Vessels, which occasions the Lympha to disengage it self, and overflow some part.

The waters sometimes gather together in a Cystis, which makes the Dropsie incurable: This Cystis is a strange Covert, at first insensible, but by degrees separates it self from some other covering, either of the Peritonæum, or elsewhere, by the saline and lixivious nutriture which it has contracted, or by the too great humidity received, after the same manner as the Particles of an Egg, or Seed disengage, or unfold themselves. This Cystis is sprinkled with a multitude of Glands, and Vessels which it receives from the part from whence it derives its Origin, and from other Neighbouring

*When the Dropsie is incurable.*

ing Parts which are as so many sources that produce new Dropsies.

*Signs of the Dropsie.*

The signs of this Disease are swelling of the Belly, transparency of the Waters, and Fluctuation.

*Difference between corpulent persons and hydropical.*

Before I speak of the Accidents, 'tis necessary to give an Idea of the difference between the swelling of the Dropsie, and a good habit of body. In the Dropsie the Belly is extreemly extended and even, the Navels rises and terminates in a point, whereas in the latter its soft, and less extended, being more elevated on the sides than elsewhere, where the fleshy Portion of the Muscles lie, and the Navel is quite hidden.

*Symptoms of the Dropsie.*

The Symptoms which accompany this Disease are slow Fever, weak Pulse, heaviness of the whole Body, difficulty of Respiration, considerable Swelling, excessive Thirst, and difficulty of Urine.

*I. Slow Fever.*

The slow Fever is nothing else but an effect of the impurity of the Chyle, and other leuens which intimately mix with it: this mixture design'd to make the life of the part happy, being impressed with this brine, or rather charg'd with this impure and strange Matter passes to the Heart how corrupt soever it be, where

where it ferments and disorders its motions, the Heart communicating its unruly Pulsations to the Arteries, excites this kind of Fever which is only felt very slightly.

The Pulse's weakness depends on the slow influence of the Animal Spirits into the Fibres of the Heart, which being incapable to augment their Action (in respect of the Spirits as well as Blood, by reason of their scarcity) maintain the blood in that little degree of precipitate motion which distinguishes this slow Fever from the other, and consequently causes this weakness of the Pulse.

2.  
*Weakness of the Pulse.*

The pale colour, and heaviness of the body, proceeds from the slow motion of the Blood, and from the dissipation and concentration of the Spirits, which are stifled and choak'd (as it were) in the Waters: now as the heat and vigor depend on the presence, and natural ferment of the Blood and Spirit, which should animate these parts, and be carried to the Surface, you must not wonder if they be so pale, and if the Muscles can't sustain the weight of the Body.

3.  
*Heaviness of the Body.*

The difficulty of Respiration is cau-

4.  
*Difficulty of Respiration*

fed by the swelling and great tension of the belly which presses the Diaphragm against the Lungs, and diminishes the Diameter of the Breast, so that the Lungs having not the liberty to extend themselves, the Respiration grows frequent and forced.

5.  
*Thirst.*

The excessive thirst is rais'd from the humors that are separated from the Glands of the Stomach, Oesophagus, and other parts of the Gula to moisten their coats, and to maintain them in the Humidity which is requisite for them, it's not enough either through the frequent setlings which are made in other parts, or that the invincible and intemperate fire, which the Fever kindles in all parts, dissipates, consumes or rarifies it, which cause these parts to heat and dry, and that saltish Spirits, whose actions are not corrected by any dissolvent, rush into the little Fibres, and produce a motion in the Nerves which excites thirst.

6.  
*Difficulty  
of Urine.*

As to difficulty of Urine, I suppose that part of the Water which used to take its course through the Kidneys, tends another way, and that the Urinous, Volatil, and other fixt Salts of the Urine, being deprived of a part of their dis-

dissolvent stop at the entry of the Pores of the Glands, and hinder the Urine from running with that liberty into its Conduit, the Salts thus having the upper hand, and finding nothing in the Blood capable to blunt their points, irritate all the parts through which they pass, particularly the Arteries, and oblige the Sphincter of the Bladder to a more than usual contraction, which causes the Urine to flow very difficultly, and by turns.

Handwritten notes: "H H" and "H H" with a checkmark.

I pass to the cure of this Disease *Cure.* which is perform'd by the help of Medicines, or Operation. The most Specifick Remedies are diureticks, and those which cause insensible transpiration, others being of no great use.

The strongest Diureticks are *Rad. Tinctura Ebul. Irid. Erysimi. Cucum. agr. fol. Solda Diuretica. nel. Cerefol. infused in Spirit Vin. Mercuri-* *fati.* It's an extraordinary remedy.

*Rad. brus. Polypond. Gladiol. Medul. Infusus sambuc. Croc. & Chryst. miner. infus'd Anthydro-* cold in White Wine, make a wonderful *picks.* remedy. *Sal. Rut. Crem. Mercurii Spirit. Salis* taken in Broth (without common Salt) are admirable. There are several other Medicines of which Authors are full; I mention here only those which I have experimented. If

If all these won't do, you must proceed to the Operation which consists in puncture made on some part, its name differing according to the place where its practised, being call'd when made in the belly, Paracentesis; in the Scrotum, Puncture; and in the Legs, Scarification.

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C H A P. VIII.

*Of the Paracentesis.*

**O**mitting the Description of the method of the Ancients, I proceed to ours, wherein we use the Trocher, or Lancet, the puncture being ordinarily made on the side four Fingers from the Navel. If with the Trocher, we make no apparatus, but pierce the belly as often as we will draw water from it: This Instrument is of a triangular Figure, and scatters only the Fibres, they upon its being withdrawn exactly reuniting again; it must always be accompanied with its Canula, when the puncture is made, which we leave in the Belly as long as the water is to be drawn. If you use the Lancet, you must

*Where the  
Puncture is  
made.*

*Description  
of the Tro-  
cher.*

Chap. 9.      *Of Hernias.*

71

must arm it with a little band of cloath before hand, and thrust it in till the water comes forth; and before you withdraw it, introduce a Probe on the flat of it, to facilitate the passage of the Canula into the Belly, then having drawn a sufficient quantity according to the strength of the Patient, stop the Canula with a small Tent, and apply good compress sustain'd with napkin and scapuler: but seeing that by this method we can't always hinder the rapid stream of the water we must prefer the Trocher.

*Method of  
using the  
Lancet.*

You must observe that the Dropsie of the Head, Breast, and Stomach are never cur'd by Operation, but by general Medicines.

*In what  
parts you  
Operation  
is useless.*

---

C H A P. IX.

*Of Hernias.*

THE Belly is subject to certain tumors call'd in Greek, *Cele*, in Latin, *Hernia v. Ramex*. 'tis defin'd a preternatural Tumor caus'd by the falling of some part, or gathering together of some superfluous Humor.

*Definition.*

The

*What Hernia signifies.*

The word *Hernia*, signifies something that's troublesome to bear : I'll use the Etymology in opposition to their opinion, who pretend it suits not with the Humeral *Hernia*, and I believe every one will agree with me, that they are insupportable as well from Humors as Parts: Hence I conclude the word *Hernia* may fit all kind of Tumors which happen to the Belly or Scrotum. I confess the word Rupture is only applicable to those in the Groin and Scrotum, from the Omentum, Intestines, or some other part. But omitting a useless multiplication of imaginary names, I pass to its species and differences.

*Names.*

And these are drawn from the parts which they attack, and the different causes which they produce ; by reason of the Parts they are call'd Exomphales, *viz.* of the Navel: Bubonocoele, of the Groins: Oscheocoele of the Scrotum : and Ventralis *Hernia*, of which hereafter.

*Differences.*

By reason of the causes which produce them, the one are made by parts, the other by the humors : The first are call'd Enterocoele, when the Intestines come forth, Epiplocele when the

the Omentum, and Enteropiplocele when both.

The latter are call'd Hydrocele, Pneumatocele, Sarcocoele, Varicocoele, and Circocoele, from Water, Wind, Flesh, and other Liquors, which are capable to dilate the Vessels.

Those made by the parts are call'd true, the Humoral false; compleat, when the parts descend into the Scrotum, or Lips of the Womb; not compleat, when they don't pass the Groin.

Causes are external or internal; the external are violent blows, great shakings, long courses or running, dancing, leaping, continual crying, vehement coughing, excess of venery, too frequent and forced breathings, and generally all the exercises, and strong efforts to which we are subject.

*Causes,  
External.*

The Internal come first from the influx and deposition of a great many Serosities, which sometimes come from the Glands of the Intestines, or the Groin, but principally from those Glands which garnish the interior Surface of the Peritonæam, all these sources make that abundance of Lympha which actually Humects, Relaxes, and Lubrifies these Parts: and consequently

*Internal.  
1.*

D

quently

*What Hernia signifies.*

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Causes are external or internal; the external are violent blows, great shakings, long courses or running, dancing, leaping, continual crying, vehement coughing, excess of venery, too frequent and forced breathings, and generally all the exercises, and strong efforts to which we are subject. *Causes, External.*

The Internal come first from the influx and deposition of a great many Serosities, which sometimes come from the Glands of the Intestines, or the Groin, but principally from those Glands which garnish the interior Surface of the Peritonæam, all these sources make that abundance of Lympha which actually Humects, Relaxes, and Lubrifies these Parts: and consequently *Internal. I.*

D

quently puts them into a condition to yield the more to the frequent and reiterated Impulsions of the Intestines.

2. The second, I suppose, depends on the great Dissipations of the oily Particles, for if we consider that the Peritoneum is near the Omentum and Mesentery, the two chief Repositories of the Fat, by which it is actually separated from the Parts, by the heat, it's easie to understand that these Parts continually greasing the Fibres of the Peritoneum, so soften and extend them, that at the least action or motion they give way very easily to the blows, and to all motions which may contribute to their formation. Hence the People of *Provence*, the Religious especially, who eat nothing but Oyl in their Food are more subject to *Hernias* than others.

*The People of Provence  
mightily Sub-  
ject to Hernias.*

3. To the third, abundance of Wind may contribute, whether we swallow it with our Food, or it be contain'd in it, or produced by the ferlings and heap of a considerable quantity of dissolvents, which by an excessive heat rarifie, and may be truly supposed capable of extending the Intestines like a Bladder, and of blowing them up to a certain degree of Tension, so that taking up more room

room than usual they impel the Surface of the Peritonæum, and nesting themselves in these productions form the Tumor.

For the fourth, the Dropsie and Fatness in Women may be admitted, this last pushing all the Parts against the Diaphragm, and determinating them rather to form the Exomphalos than Bubonocoele, the other Humects and Relaxes the Peritonæum so considerably, that after the dissipation of the Water it can no more resist and support the Motions of the Intestines.

I pass to the Consequences which we must draw from the Causes of Hernias, relating to the Structure of the Parts where they are form'd, which depend as well on the disposition of the Peritonæum as the Mechanick motion of the Diaphragm, Muscles of the Abdomen, and Intestines.

I look on the Peritonæum as a Membrane of a considerable thickness dispos'd in the shape of a sack, containing all the Parts of the lower Belly; 'tis so long as to reach to the Navel and Groins, to accompany the Umbilical and Spermatick Vessels which run between its Duplicature; this is in short the Idea you must have of it.

*What's to be consider'd in the Peritonæum.*

Let's now examine the Muscles of the Abdomen, whose carnos Portions gar-

*What about the Muscles.*

nish the Lateral Parts, and their Aponeuroses occupy the forepart of the three Regions ; three of which Muscles are perforated towards the Groin for the passage of the Spermatic Vessels : The first hole is of an Oval Figure belonging to that Aponeurose of the external oblique, and being dilated well enough, represents the handle of a Hammer, whose two extremities are fastned to the *Os Pubis* reaching a little towards the Crest of the *Os Ilium*.

This hole is lin'd externally with a little thin and delicate Membrane, which accompanies the Cremaster Muscles to the Testicles, and is nothing else but an expansion of the Tendinous Fibres. The other two are of the Separations of the fleshy Fibres of the Internal Oblique, and Transverse : These three Rings don't directly answer one another, being separate about three or four Lines. The first that presents it self to us in performing the Operation, is that of the external Oblique, which is the lowest, and in which is made almost all the Strangulation of the Gut, because the Tendinous Fibres don't obey so well as the Carnous, and are more subject to inflammation ; for which reason 'tis that most don't scarifie this ring in the Operation ; that of the Internal Oblique is a little higher, and  
that

that of the Transvers highest of all ; it's easily observable, that if nature had plac'd them one against another, there wou'd at the least effort happen a Hernia. The right Muscle reaches from the *Cartilago Ensiformis* to the *Os Pubis*, lying all along the sides of the *Linea Alba*, and seems to be divided into four Muscles which are distinguished by four Tendons call'd by the Antients *Eneruations* ; this Muscle partly obscures the Motion of all the others, which otherwise would so strongly compress the Guts, that if it, like a movable Bar, did not oppose their powerful contraction, they would oblige the Parts every where to regurgitate out of the Belly.

I'll add a word or two concerning the *Linea alba*, which is formed by the union of the Tendinous *Fibres* of the Aponeurosis of the oblique and transvers Muscles which Aponeurosis make a kind of separation, and mark the interval between the right Muscles ; so that to shew these two Muscles, we are forc'd to cut those Aponeuroses under which they are hid : I pass now to the action of every Muscle in particular. The external oblique pass obliquely from above downward, according to the disposition of their *Fibres*, just as the internal pass from below upwards.

*What the  
Linea Al-  
ba is.*

The transvers press equally the Flanks, and the action of the right is felt all along the sides of the *Linea alba*: These Muscles so dispos'd, press equally all parts of the Belly, when they are contracted, in time of expiration, and maintain it in a level always united.

After all these reflexions, if we make a just application of the causes of *Hernias*, according to the Mechanism of the parts where they are felt, we shall find something to satisfy our curiosity, considering that violent blows, rude shakings, long courses, excess of venery, dancing, leaping, and generally all efforts are capable, not only of moving the Guts, but also of relaxing their connexions, hence Posts, Postilions, Dancers, Leapers, &c. are troubled often with them: To these we have added Crying, vehement Coughs, and all too frequent expirations and inspirations, hence Musicians, Singers, and Children (whose parts are soft and spongy,) are so much subject to them.

In all these efforts, the Guts are so pressed, and repelled on all sides by the Diaphragm and Muscles of the Abdomen, which as so many Hands and movable Napkins, oblige the Omentum and Intestines to strike and apply themselves so strongly against the surface of the Peritonæum,

næum, that they are constrained to regurgitate through the weakest places, as a piece of Wax between the Fingers when it's squeez'd with the Hands, they push, I say, and dilate the interior Membrane of the Peritonæum, where it's least assisted by the exterior, and sink into the rings of the Muscles forming a Sack, which is greater or less in proportion to the strength of the Impulse. This Sack nests its self all along, and at the sides of the productions of the Peritonæum, which are form'd by *An Ancient Error conjectured.* its exterior Membrane, and not in the productions which envelop the spermatic Vessels, as most imagine: This Idea we must have of the formation of the Purse, which includes the Intestine, and which makes the *Hernias*, if there be any little indisposition in the Oyl, Water, Wind, and Tumours, which we have establish'd for internal causes.

The Ventral Hernia remains now to be examin'd, which happens sometimes *Cause of a Ventral Hernia.* between the right Muscles, sometimes between the Navel and Flanks, exactly at the Aponeurosis of the Muscles, to be convinc'd of which we are only to represent to our selves, how strong the moving force of every Muscle is, which occupies the Flanks, different from the Aponeuroses which have no other motion than that,

which their carnous part communicates to them; for though it be true, that all the Muscles Reunite themselves to one sole point of the Navel, where the concurrence of their action is, yet it's probable that their carnous part is much stronger, and more vigorous, and by that means more capable of resisting divers shakes of the Intestines, as experience teaches us, unless it be bruised, or cut by some blow: We observe also, that that the Ventral Hernia never happens in the carnous part of the Muscles, but always in the Aponeuroses, or in the space between the right Muscles, particularly, in the course of some fatness. For in these kind of tumours, the Belly rises, so that it obliges these two Musculous bands to part, and the Intestines finding weak places, fail not by their impulsions, to dilate these parts, and so cause the *Hernia Ventralis*.

*Hernia  
ventralis  
and Exom-  
phalos, not  
so common  
as Bubono-  
cele.*

If this, and Exomphalos, are not so common as Bubonocèle, 'tis because the parts, and Humors are more inclining to be carried downwards towards the Groins than elsewhere; and the disposition of the rings of the Muscles, which contribute the more to it, as their overtures are widened and relaxed, so that if the parts are put in motion, they insinuate themselves, and slip insensibly through the opened passages,

sages, and where least resistance is made.

*Fabritius Hildanus* relates, that he has seen a Hernia made by the descent of the Spleen, this curious remark shou'd move the Surgeons, call'd to this kind of Disease, to pronounce not always in favour of the the Epiploon and Intestines, before good examination, particularly, when the tumor is of an extraordinary bulk, since the ligaments of the Liver, Pancreas, and Kidneys, being relax'd, they may as well as the Spleen, contribute to its formation. According to the order, I design in speaking of so nice an Operation, I think it more proper, successively to describe the Signs of all kinds of Hernias, that I may not confound them.

*Hernia caused by the descent of the Spleen.*

*Also the other Viscera*

I begin with those of the first kind of Hydrocele, in which the waters are spilt between the Membranes of the Scrotum, which are light tension, considerable largeness, heaviness, we feel an undulation when we handle the tumor, and perceive the transparency of the waters when we hold a light behind, and the skin becomes tender, soft, without pain, and looks extremely shining.

*Signs of Hydrocele.*

In those of the second kind, where the waters possess the Membrane of the Testicles, are great tension, pain, greater heaviness than in the other, the skin of the Scro-

tum is not so much extended, and keeps its rugosities, though it be very much swell'd, it possesses ordinarily but one side, the Fluctuation's deep, the transparency more obscure. It's to be observed, that these two sorts may conjunctly meet together.

*Signs of  
Sarcocoele*

The signs of *Sarcocoele* are, great hardness, insupportable weight, and insensible augmentation of the tumor, if there appears no elevation in the Groin, it's a sign that the productions of the Peritonæum are not accompany'd with any carcinomatous substance : It's distinguish'd from the *Hernia Intestinalis*, that the one's soft, the other is hard ; this tumor may be divided into Scirrhus and Malign, in the Scirrhus we feel neither heat nor pain, but in the Malign, an excessive heat, and sharp burning pain.

*Varico-  
cele*

Signs of *Varicocele* are great inequality, heaviness, pain, and Inflammation, particularly, when it's irritated with some Medicine ; it's also known because it makes a Man somewhat impotent, especially, when it possesses both Testicles.

*Circocoele*

Signs of *Circocoele*, which is caus'd by the dilatation of the external Vessels, different from the *Varicocele* which comes from the Internal, are the same as the former, except there is less pain, weight and In-

Inflammation; add that the Membranes of the Scrotum are more extended, and the tumor more apparent.

*Of Pneumatocele.*

Signs of Pneumatocele are, when the tumor disappears from time to time, it sounds like a Drum, when it's struck without pain, weight, and inflammation, very transparent, the colour of the Cutis changes not, and the Wind is felt, sometimes above sometimes below.

*Signs of Hernias made from the parts.*

Let's now examine the signs of those Hernias, which are caus'd by the parts, and enquire exactly into them, because 'tis of the greatest importance. In the beginning of these Hernias, they are ordinarily soft, without inflammation, change of colour, disappearing at the least pressure, except they be caus'd by some Blow, Fall, or such-like inconvenience, and are not accompanied with some Strangulation, caused by Matter, stopt and harden'd in the Intestines, either by the course of the Blood and Spirits in these parts, which presently excites inflammation, and often mortification; therefore you must do no violence to the tumor by rude handling, lest it occasion a Gangreen; but that we may have a clearer notion of all these signs, let's examine them in particular, and see what are those which make us distinguish all these kinds of tumors.

If

that  
it is

Signs of the  
Omentum.

If the Gut be engaged, without Inflammation, Strangulation, or adhering to any part, the tumor's soft, plain, and the colour of the skin not chang'd; it disappears from time to time, particularly, when the Party lies on his back: When the Intestine is reduc'd, a kind of whistling noise is heard. But if it's in Omentum, the tumour's soft, and doth not return so easily. It's unequal, by reason of the Bands and Fat with which it's charg'd; when press'd with the Fingers, there remains a mark, and we feel the same resistance as in pressing a Steatomatous tumor: This is more subject to mortification, because the texture of the parts of which it's formed, is loose, spongy, and more subject to corruption, so that at the least impression, the Blood stops more easily there, than any where else; wherefore, you must not delay the Operation in certain occasions, as we shall hereafter mention.

*Note,* That if Inflammation happen, it's always at the Intestines side; if it's the Omentum, it grows livid at the least alteration

Inflamma-  
tion, a ve-  
ry severe  
symptom.

As for the Accidents, I find none more dangerous than Inflammation, which is always accompanied with pain, Fever, Strangulation, and sometimes with the Illiac passion, where the excrements are often forc'd

forc'd against their own weight to mount, and come out of the Mouth, the cause of which cruel Symptom proceeds from the Guts, being inflam'd by the excrements which are lodged there : It communicates this Inflammation to the rings of the Muscles, particularly to those of the external oblique, which by reason of its tendinous Nature, fails not to shut up the Gut, and augment the Inflammation by a reciprocal action, which causes interruption of the course of the Blood and Spirits in that part ; from thence comes the reflux of the excrements, lividity and mortification. It's easie to conceive that, having lost their motion, there can follow nothing but divulsion, pain and loss of Life.

There's yet another kind of lividity which comes from having handled and press'd the tumor too much : These unprofitable Touchings are as so many Bruises, which are imprinted on the part, the Gut and Omentum being press'd, the Blood stops in the Vessels, which causes immediate mortification, and change of colour. It's also known by the pain which is greater, as we have said ; The Surgeon seeing all these bad Symptoms ought to retire.

*When the Surgeon ought to avoid the Operation.*

The rest of the Accidents I reserve till I describe the manner of performing the Operation.

An Idea of  
the Umbi-  
licus.

I begin with the Exomphalos, but before I enter on the Operation, I design to give an Idea of the disposition of the Navel. It's form'd by the Reunion of the Umbilical Vessels, which slip obliquely into the thickness of the Peritonæum, which accompanies them, and piercing conjunctly the *Linea alba*, fasten themselves to the surface of the Cutis, where they leave a little tumor, which is call'd the Navel after the Birth. In the Fœtus, the way through which these Vessels pass, are as manifest as the rings, of the Muscles of the lower Belly, are in Adults, but after the Birth they shrivel up, and turn into Ligaments; and as the parts where these Vessels meet grow bigger. They oblige the Navel by their own weight insensibly: From which I conclude, that all the difference between the passages of the Umbilical and Spermatic Vessels is, that the latter are easily distinguish'd and separated one from another, whereas those of the Navel are not at all distinguishable, because they shrivel up, and the tendinous *Fibres* of every Aponeurosis twist themselves so one into another, that all their parts seem to be continuous. It must also be observed, that the Navel is without Flesh about half the breadth of a Finger round about, all this contributes to the formation of the Exomphalos.

CHAP.

## C H A P. X.

*Of the Operation of Exomphalos.*

**A**FTER having us'd Bandages, and all Medicines, as well general as particular, without success, you must prepare the Sick to the Operation: Being dispos'd, the Surgeon must lay him on his Back, without violating the tumor, and endeavour to reduce the Intestine into the Belly, pinching up the skin on one side, whilst a Servant does the same on the other, and with a Bistoury incise all along the side of the tumor, that he may avoid the Umbilical Vessels, particularly the Suspensorium of the Liver, for this Visera being no more suspended, the *vena cava* would be compress'd, and the Circulation hinder'd, which would cause Death.

*How to perform the Operations*

*Danger of the Suspensorium Hepatis.*

If you are sure of the reduction of the Intestine, you must softly incise still into the Cavity of the Belly, and scarifie the Lips of the Wound in all its extension, to procure a strong Cicatrix; make the intersected stitch; some pretend the Quill'd Suture is more convenient, because it more strongly resists the motions of the Muscles and Intestines. You must introduce the Tampion of Lint tied to a Thread, to hinder the regurgitation of the parts, and to give way to the Matter;

as it Incarns, you must diminish your Tent proportionably, till the Cicatrix be formed. Here good Diet, and repeated Clysters are to be preferr'd before other Remedies, as in *Gastroraphia*.

This Operation includes other particulars, which will more properly fall under the Discourse of the *Bubonocoele*.

## C H A P. XI.

*Of the Operation of Bubonocoele, and Hernia Compleat.*

**T**HAT I may not confound all the circumstances which accompany Bubonocoele and Hernia compleat, nor mistake in the order which I have propos'd in describing them. I am forc'd to comprehend them both in one sole Operation.

These tumours are either wandring or permanent, they disappear sometimes, or remain always in the same condition. If they are wandring, 'tis a sign of no adherence, and that the Intestines suffer no compression, than the Bandage alone, and general Remedies well ordered, may finish the cure. If they be permanent, it comes from the inflammation adherence, or from some excrements hardned in the Intestines: We know when the Epiploon is fastned there, by the signs spoken of heretofore; which

which induces us to make the Operation without irritating the tumour, for it alters at the least impressiion, and it is very hard to reduce into the Hypogastrium.

I have made you observe, that the Inflammation and Strangulation succeeded the induration of the excrements contained in the Gut, according as it swells and grows thicker by the flowing of them; the ring of the external oblique, which does not obey as the others, for the reasons already mention'd, restrains it proportionably as it dilates, which causes the Blood and Spirits not to circulate with the same liberty, and the Inflammation of the Intestine to increase equally with the Strangulation. You must also observe, that the Gut never contracts any adherency, but with the bag that makes the Hernia, unless some sharp and strange Matter has corroded it.

This bag is sometimes adherent to the cover of the Spermatic Vessels, sometimes to the Omentum, or to the rings of the Muscles in all their circumference, or in some part only, to the Dartos, or finally to the Membranes of the Testicles; so that the Intestine cannot return into the Belly, unless separated by Incision, which necessitates the Surgeon to use his utmost Prudence and Dexterity, if he means to succeed

*The most difficult part of the Operation.*

ceed in so nice an Operation; the chief circumstance of it indeed, being carefully to examine where the Gut is fastned, not only because the œconomy of the Operation must be changed, but also because this Knowledge rules our Judgments, and causes us to make a favourable or dangerous Prognostic.

*A dangerous Symptom.*

The Hernia where the Intestine is adherent to the Testicle, is very dangerous, and for the most part mortal. If it be an old one, the happiest can't be rid of it, without loss of the Testicle. The true way to know whether there be any coherence, is to question the Diseas'd, how long 'twas since the tumor did not disappear, whether he feels vehement and pulsific pains, and great weight on the Testicles.

*Signs that the Gut adheres to the Testicles.*

If the Intestine be once fallen down into the Purse, and that it keep there some time without returning, and there appear no Inflammation in the Groin, it's a sign that the Sack which contains it is joyn'd to the Testicle, by the action of the viscus Humors which run from the Peritonæum, or even from the Membranes of the Testicle, these Humors growing thick by heat, are like a kind of a Glew which ties them close together, and if the Matter come to dry up by the reaction of the Blood and Spirits, it's impossible to sever them

them without offending the Body of the Testicles. You must observe, that if the Gut does not return into the Belly, 'tis not always a sign of adherence: It may be inflam'd, or contain some excrements, which is the better distinguished, because we know that it had the liberty to enter before the Inflammation. We commonly undertake the Operation when the Inflammation hinders the Matter from entering the Intestines.

Having examined the different conditions of the Diseas'd, if there be any of them which induces us to perform the Operation, we must use this method.

Lay the Patient on his Back ( I suppose here, that the intestine is stopt in the Purse, fastned to the Testicle, and Inflam'd) then Incise with the Bistury the skin of the Scrotum, near the Thigh, all along the tumor, then separate the two Lips of the Wound, for to break gently with a Fleam, or your Fingers, all the tegaments of the Intestine and Testicles.

*How to perform the Operation.*

As for the precautions which we must observe to distinguish well the Intestine from the Sack, which forms the *Hernia*, its brown colour, I suppose, is the most convincing Sign, by reason of the many Blood Vessels which irrigate them: It forms a kind of Arch which is sensibly per-

*How to distinguish the Gut from the Sack.*

perceived when discover'd ; besides if it's the Gut, the tumor lessens : It's always thicker than the Peritonæum, being composed of four Tunicles. I agree, that this Sign is equivocal, so much the more, because the Sack of the Peritonæum grows often to a very considerable thickness. There runs always from the Intestine a thick and stinking Matter; whereas from the Sack of the Peritonæum, comes only a clear and lump water. The Intestine obeys when you pull it, provided it adhere not to the Neighbouring parts, different from the Peritonæum, which obeys very little, and the Patient feels always a dull pain : These are the chief Signs which ought to make a Surgeon circumspect. I pass to the particulars of the Operation. The Intestine being discovered, you slip your hollow Probe between the Membranes of the Scrotum, and the Body of the Intestine for to widen the Aperture, and to discover it naked, to be able to separate it the easier from the Testicle : A Servant lifts the Intestine, and pulls it gently with his Hands towards the Pubis, whilst the Surgeon pulls lightly the Testicle with his Hand, to have the liberty to break with the Fleam, or point of the Bistoury, the Membranous ties, observing alway to cut them nearer to the Testicle,

than

than Intestine: If their adherance be very strong, it wou'd be better to indammage the Testicle, because it's not so necessary for Life, and the Accidents not so dangerous; you must alway avoid the Spermatic Vessels, for fear the Blood trouble the Operation: Having freed the Intestine from the Testicle, you introduce your hollow Probe between the Cutis and Intestine, and cut without fear to the ring of the Muscle, where consequently you are obliged to give way by a new Incision, to disengage the Intestine from the Strangulation, in case there be any. You pass the third time the hollow Probe between the Ring and Intestine, stirring it a little to be certain that the Gut be no way engaged, and slip a crooked Bistory into the hollowness, and you cut from the ring about two Lines, and a Portion of the skin, avoiding a little branch of an Artery, which runs by the Aponeurosis of this Muscle.

When you free the Intestine by the dilatation, you pull it out a little for to disengage it from the internal rings, and give liberty to the excrements which it contains to spread themselves; by this means it grows less tumid, and extended so, that the reduction of it is much more easie; you do it with your two Fore fingers,  
and

and press not the Intestine too much, lest you bruise it : Being reduc'd, a Servant must press with his Hands the Neighbouring parts, to hinder its falling out again : Some make several little Incisions on the Circle of the Ring, all along the Purse, which makes it incarn, and cicatrize stronger ; others content themselves to introduce into the Rings a thick Tent of Lint tied with a wax'd Thread, and a length proportionable to the depth of the Wound, to bruise them as it were, and excite a speedy suppuration ; some apply them dry, and others dip in some digestive, according to the pain which is felt, or humidity which relaxes these parts. But the true method to hinder this Disease from relapsing is, to introduce into the Wound, a long Tent of Lint, which resists the impulsions of the Intestine, which alway endeavours to dilate the rings, and so often makes the Operation unsuccessful. A Servant holds it on whilst the Surgeon applies the rest of the Apparatus, especially, good defensives which oppose Fluxions that may happen.

There are several Practitioners, who would, that at the same time the Testicle be cut off ; but this method is not approved of, because it contributes not to the cure of the *Hernia*, but rather, as Experience

ence demonstrate, prolongs the Operation, makes the Patient suffer without necessity, and deprives him of the proper means of Propagation ; but if even the Testicles should be alter'd, so that they cou'd not be secur'd, 'twould be always more advantageous to defer the Operation till the Fluxion be a little moderated. If the Omentum be in the part, and altered, you make the Ligature in the sound part, and take off the corrupted : It may be avoided, if the tumor be recent, and preserv'd in its natural State ; if it be strongly fastned to the Gut, you must if possible reduce them together, provided there appear no sign of mortification. Whether it has contracted any tie with the Intestine Testicle, rings of the Muscle, or with the productions which include the Spermatic Vessels : 'Tis always better to take away some of its Substance, than of the Substance of any of these parts, if necessity compel you to it. Yet I own, if it should at all adhere to the Sack that contains the Intestine, provided it be sound, 'twould be better to hurt the Purse than Epiploon. But as it cannot remain long in that condition without being altered, we are always forc'd to cut a great Portion of it : You must take care in making the Ligature, that you don't straiten  
the

the part too much, because 'tis of a loose texture, spongy, and easie to be cut. You pass the Thread several times all about slightly, straitning it after having pass'd the Needle through its Substance.

In the Operation of the *Bubonoccele*, you make not so great an Aperture, but make it according to the extension, and bigness of the tumor. Concerning the rest, you follow the same Rules, and observe the same circumstances formerly mentioned.

When you have discovered the Purse which makes the *Hernia*, you tear it to pieces dexterously with your Nails, or the Fleam, and if instead of the Intestine you find water, be not surpriz'd with the supposal that you have hurt the Intestine, but take Courage, and remember only the signs of which we have spoken, which will fortifie you, and put you into a condition successfully to perform the Operation; for 'tis only the Purse which is full of waters, in which the intestine floats: These waters are furnished by the Glands of the internal surface of the Peritonæum; and by those of the Intestines, or by the eruption of some Lymphatic Vessels: These are, if I mistake not, most of the particulars which this Operation contains; after having Embrocated with Oyl of *Roses*, you must apply good deservatives  
over

over the part and Hypogastrick region, with good compress moistned in *Oxycrate*, and sustain the applications with the simple *Spica*; in all these affects, you must alway ease the Purse by a *Suspensorium*, and prefer *Clysters* before other general Medicines.

## C H A P. XII.

*Of Castration, occasion'd by Sarcocoele, and Varicocoele.*

**T**HIS Operation is not alway to be Practis'd, unless other methods prove ineffectual: In the four following cases, I suppose it necessary. 1. When it's so closely fastned to the Intestine, that one is forc'd to take much of its Substance off. The 2. is in contusion, when the Vessels and Vesicles are crush'd together, and the course of the Blood interrupted, which is known by the blackness of the Testicle, and mortification which follows soon after, if the progress of this commotion be not hindred. The 3. is, when the Testicle is varicous, and the virulent Humours which cause the tension and dilatation

*When the Operation must be perform'd.*

E

litation of the Vessels can't by Medicines be resolved ; this case is not so pressing as the others, unless the Patient be resolv'd to endure the Operation. The 4. is in all old Excrescencies.

To have an Idea of their generation, you must consider that the one attacks the Substance it self, and the other its Tunicles, after this you must look upon the Spermatic Arteries, as the true source and channels which convey the Matter, of which the Carnosities are form'd, and that the Arterial Blood, furnishing the Testicles with the Matter of Seed, to be prepared there, lets slip in this Elaboration, its most greasie and viscous part, which the moderate heat that we find there condenses in the little channels which compose them, or in their Tunicles, almost as the white of an Egg hardens over a moderate Fire: This Matter coming to swell and extend these little tender Pipes, produces that which we call a spongy and carcinomatous Excrescence. It's only a swelling of these little Filaments, which a strange Humour forces to rise in a tumor. You may also observe, that by the over-growing of a new Matter, it becomes very often so remarkable, that  
one

one can't long carry this burthen, without discharging it: If it happen that by what cause soever this Liquor should be determinated, rather into the Membranes of the Testicle, than any where else, and that there's form'd a Carcinomatous Substance all along the productions of the Peritonæum, which encroaches sometimes upon the Interior parts of the Belly; I suppose, that the Operation will then be needless, because this carnosity occupying not only the vaginal Tunicle, which is a dilatation of the productions of the Peritonæum, but also the productions themselves; you would ruin the Vessels, Rings, and several parts included in the *Hypogastrium*.

I will not repeat here the signs of this *Progn.* Disease, as for its Prognosticks, they *stick.* are always very bad, because it costs the Testicles, if any carnosity possess its Substance, for it can't be consum'd without destroying it, and the surest way is the Operation.

## C H A P. XIII.

## Of Castration.

**T**HE Patient being laid on his Back, the Surgeon Incises with a very sharp Instrument, the Membranes of the Scrotum upon the Body of the Testicle, to discover the carnosity, which must be separated from the Dartos, without offending the cover of the seminal Vessels; being freed from the Neighbouring parts, you make the ligature of the Vessels between the Rings and the tumor; you must cut them half the length of a Finger from the ligature, and take away the Testicle with the *Sarcoma*; you leave an end of the Thread out of the Wound (avoiding to pull the Spermatick Vessels to you, or compress them too hard, lest the Patient shou'd fall into a *Convulsion*) that they may not slip into the Belly where they wou'd shed Blood, and so cause Death in a little time: If the tumor be considerable, scirrhus, inflam'd, painful, and possesses both the Testicles, and of continuance, the Operation is very dangerous.

If

*The Spermatick Vessels not to be tied too hard.*

If the productions of the Peritonæum be carcinomatous, and you have a design to make the Operation, you must first consume the Flesh by the help of potential cauteries, or molifie them by a powerful suppuration, yet it must be avoided if the tumor extend it self into the cavity of the Belly, for the reasons before mentioned. When the superfluous Flesh is consum'd, and the Eschar fallen, if the Vessel be preserved, you make the ligature by the Rings of the Muscles, and take away the Testicle, as I have said; for should you make it before the fall of the Eschar, the Patient would suffer dangerous *Convulsions*. You fill the Wound afterwards with *Dossils* dip'd in some digestive, and emborate, and apply defensitives, compresses, with a suspensorium, ordering Bleeding, Clysters, and other general Remedies.

## C H A P. XIV.

## Of Hydrocele.

A Hydro-  
cele from  
Ascites in-  
curable.  
Unless you  
cure the  
Ascites.

Other cures.

**I**F the Hydrocele be the consequence of the Dropsie Ascites the Operation is useles, because there runs alway new Matter, which presently produces another Hydrocele, so that unless you dry up the source, there's no hopes of cure: In this the waters occupy alway the *tunica vaginalis*, and run from the capacity of the Abdomen through the prolongations of the Peritonæum. All other sorts of Hydrocele proceed from the slow motion of the Blood, or its dissolution: Falls and Blows may also contribute to their Formation: The reason is, that the Blood Stagnates more easily in these parts, which causes the serosity to separate from it on the same principle, I say, that the circumvolutions and serpentine turns, which the Spermatick Veins form in their Root, are for the most part the cause of it, if the Blood be the least dispos'd to it, for seeing it doth not circulate here, but with much ado, the

the serosities have time enough to separate and distil into the Purles.

Having examined the signs of the two sorts of Hydrocele, when we spoke of those of the *Hernia Intestinalis*, we'll say nothing more of them than the Prognostick, which is only of ill consequence when the waters are included in a Cystis.

We must now examine all the circumstances of both kinds, which require two different ways of Operating : We have observ'd, when we Treated of the signs, that the first kind of Hydrocele, is distinguished and known, when the waters extraordinarily swell and extend the Membranes of the Scrotum.

## C H A P. XV.

*Of the Operation of Hydrocele.*

**T**His Operation consists in making a puncture into the Scrotum with the Trocher, accompanied with its Canula, through which the water runs freely, and when 'tis emptied, you withdraw your Instrument, and the Cutis of the Cods becomes rugous as before, and the aperture stops exactly. This is performed without trouble or danger, but omit not drying up the source by the use of general Remedies, otherwise the tumor will not fail to return.

The second kind of Hydrocele, which generally possesses only one side, ordinarily attacks the Tunicles of the Testicle. It's also much more painful through the great tension of its Membranes.

*The method  
of the Operation.*

The method requir'd in this, consists in making the aperture deep and large enough, as well to give vent to the water, as to carry Medicines thither, which have the Virtue of dissipating the Membranes that are imbued

bued with them; we use to make the aperture at the side of the Scrotum with a Lancet, or a Potential cautery, to avoid the Spermatick Vessels, and seeing the cautery makes a great Eschar, 'tis to be preferr'd before the Lancet, because you are in less danger of offending the Testicle, and you dissipate insensibly the Membranes by Suppuration. *The Caustic better then a Lancet.*

You must *Note*, That seeing the Waters hinder the action of this Remedy, in blunting its corrosive Particles, if the first that is apply'd makes not an Eschar deep enough, it's necessary to apply another, when the Eschar is off, you fill the Wound with *Dossils*, and leave those which cover the bottom four or five days, before you take them out; to the end, that by their stay, the Matter which is stop'd become more sharp, and that they may dissolve more easily the Tunicles which contain the Waters; you suppurate it and dress it as an ordinary Wound.

Before you go further, you must also observe, that if the waters grow sharp and corrosive, or rather lixivious, they change often into Pus, which

makes the Testicle alter and corrupt, so that you are forc'd to take it out.

*Cure of  
Pneumato-  
cele.*

As for Pneumatocele you must use the bandage, and all the carminative Remedies, as well internal as external; and as it's a part of the Surgeon's prudence, to order them according to his Knowledge; I shou'd be ridiculous, if I should boast here of Remedies which Authors are full of.

## C H A P. XVI.

### *Of the Phymosis.*

*What Phymosis is.*

**T**HE Phymosis is nothing else but a shrivelling, and contraction of the extremity of the Prepuce, which compresses so hard the Glans, that if you don't give it Air by way of Incision, it becomes inflam'd, and often mortifies.

This incommodity is either natural or accidental, the natural comes from the parts being yet concentred, and as it were, retir'd into its Tunicle, and that one has not yet betaken him-

himself to any exercise or touching:  
The Prepuce forms in this affect *As Veneris*  
wrinkles which are like so many little  
Bolsters, between which gathers and  
stagnates a tenacious Matter, separated by the Glans with which the  
inner surface of the Prepuce is sprinkled, which thickens by the heat, and  
growing impure by its stay, there is  
as it were a kind of Glew which fastens the Prepuce to the Glands, and  
so straitly presses it, that it will not  
let the Urin flow.

The Surgeon therefore first endeavours to free the parts, pulling to him the extremity of the Prepuce, then introduces at the side of the *Virga* an Incision knife between the Glands and Cutis, piercing the Prepuce without danger, and cutting all between the Instrument and Extremity of the Glans: If one Incision be not enough to discover it, you may boldly make another on the opposite side, the sole motion of the parts being capable to extend the Fibres of the Prepuce, and render them obedient, and make them that they restrain and dilate themselves according to the necessity of Nature.

You

*Caution.*

You must not use this Operation till you have tried Fomentations, Emollient injections, and all other Remedies in vain; which method is to be observ'd in all Operations.

The second kind of Phymosis is caus'd by some Inflammation, Shanker, Ulcer, Induration, Callosity, and often by irritative Remedies misapplied; in all these cases, whether the sharp Humour which comes from the Ulcers, irritate the parts, or corrosive Medicines, it happens that the passage of the Blood and Spirits is hindred, and the Inflammation becomes so considerable, that the Fibres are no more in a condition to obey: This is also the reason why this virulent Sanies which comes from the Shanker, excoriates these parts, excites sharp pains, felt only at the extremity of the Yard, and Inflammation, which is soon followed by a Gangreen, if you hinder not its progress.

*Cause of  
Pulsation  
in the part.*

The pulsifick pain which is felt in this part can't proceed but from the Glans which is covered with a thin and delicate Membrane, humected by a great number of Vessels,  
par-

particularly of Nerves, and that its Substance is of a very fine and sensible texture; so the motion which these virulent Matters imprint on the Spirits, not being able to communicate themselves to the rest of the Yard, because of the force and thickness of the coverings of the cavernous Bodies, the pain must needs augment and become much more sensible and acute in this part.

But before you resolve on the Operation, use Bleeding, Fomentations, Suppurations mixt with some preparations of *Mercury*, which you must introduce with the end of your Probe, the cerot of *GALEN* Emollient injections, a Ball of Lint put between the Glans and skin, compresses wet in *Oxycrate*; in a word, all these Remedies must be apply'd, But especially the Situation of the *Virga*, which must be laid on the Belly, and sustain'd with a little Bandage.

## C H A P. XVII.

## Of Paraphymosis.

What *Paraphymosis* is.

**P***araphymosis* is a Disease quite contrary to a *Phymosis*, in one, the Glans being hidden, in the other, Strangled, and so strip'd of its Prepuce, that you can't cover it again.

Cause.

The cause of this Strangulation comes sometimes from the overthrow of the Cutis, which forms a sort of Bolster, and sometimes from Inflammation, which a Shanker or some other tumor preceded; if the Strangulation be considerable, there must needs follow interruption of the course of Blood and Spirits in these parts, and consequently a mortification: In this affect the Yard swells so hard, that it forms three or four Bags, as it were alternately dispos'd half a Finger's breadth one from another: These purfings come partly from the obstructions, and partly from the reflux of Blood and Spirits in the Body of the *Virga*, they are commonly follow'd by a tumor which occupies the neck of the

the prepuce, and which is full of a reddish water, which by the great heat of the part so rarifies ordinarily, that from an Aqueous it becomes Windy.

This tumor augments so considerably the Inflammation, that if you don't scarifie deep the tumified places to give a discharge, the Penis wou'd not fail to mortifie.

You must endeavour to reduce the Prepuce without compressing the Glans, or putting your Thumb on its extremities, as most do that treat of this Disease. *How to bring over the Prepuce.*

The Reason is, that when the extremity of the Glans is pressed, it enlarges it self, and swells more, which instead of making the prepuce slip, rather folds up, and hinders its reduction.

You use almost the same Remedies as in Phymosis. There be some that pour cold water on the Belly, but I think it of no great use, or at least see no great effects of it; for want of these Remedies, you may use in Inflammation some Styptick water, in which, dip your compresses, and apply them about the part, you must also keep the

the same Situation and Bandage as in *Phymosis*.

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## C H A P. XVIII.

### *Of the Stone and Lithotomy.*

**T**HE STONE with which Mankind of all other Animals is most troubled, is called in Latin, *Calculus*, and those affected with it, *Calculosi*: Its origin wou'd have been always unknown to us, if the Chymists Art had not discover'd to us the secret of its formation, in shewing the principles which Compose it by the just Analysis that Science makes of it.

*The Opinion of the Ancients concerning its formation.*

All the Ancients and their Abettors have alway maintain'd with great heat, that the Stone is form'd by the most Crass, Course, and viscous particles of Blood, which being carried into the Bladder with the Urine, came to be the Matter of the Stone.

*Of Hypocrites.*

*Hypocrates* imagined, that the Stone was form'd by the Urines retention in the Bladder, and that the most gross

gross and terrestrious Particles stop'd there, and stuck to the bottom almost in the same manner as the Gravel gathers in the bottom of a pot, where the Urin has been long retain'd, and that certain slimy Particles gather there, which serve for a tie to the little Gravels there assembled, and that after this manner, by the overgrowing of a new Matter, the Stone becomes insensibly bigger.

This Opinion is more probable than solid; for it's evident, if the Stones were form'd after *Hipocrates's* way, supposing the principles which he admits, 'twould doubtless not have consistence strong enough to resist the Hammer as this doth, it's much more reasonable to believe, that what we see in the Urinal of those thus Diseas'd, is nothing else but the Volatil Spirit of Urin, which taking its flight, sticks rather to the sides of the Urinal than bottom, as experience demonstrates.

*Fernelius* pretends, that all the *The Opinion* Stones which are found in the Blad- of *Fernelius*.  
der fall from the Reins by Nephritic<sup>us</sup>.  
pains, and says, That if the Gravel which passes from the Reins  
into

into the Bladder, be of any considerable bigness, and that it lies there for some time, the Stone is form'd there, which grows bigger and bigger by the access of new Matter which comes to it without intermission: And that which fully perswaded him to believe, that Nephritick pains excited the Gravel to fall from the Kidneys into the Bladder, was, That he never found any one troubled with the Stone, but some Nephritick pain went before.

He says also, That when you break the Stones which are wholly form'd, you find in the middle a little Kernel, which has a covering different in Colour, and Substance from the rest of the Stone, and whose Figure perfectly imitates the Pelvis of the Kidneys, from whence he concludes the Stone is formed in it, before it falls into the Bladder.

*Fernelius* wanted nothing more than the knowledge of the principles of the Stone, to have had a perfect Idea of it: And what made him fall into this Error, after *Hipocrates* was, That he founded himself on  
• that

that old Maxim of the Ancients, that Stones are formed by the terrestrial and gross particles of the Blood, which disengaging themselves from the others, and uniting together, form Calculus.

The only reason which they give for it, is, that these Gravels are very firm and massy, and that such Bodies can't be fram'd, but by the assembling of that which is most irregular, and heavy in the Blood. They pretend also, that we must conceive this generation to be like the gross and massy Bodies which are made on the Earth, to which the formation of the Stone in Man's Body has a great deal of Analogy: All Minerals having no other principles than the most inflexible and weighty Particles of the Earth: But this is a prejudice grounded only on the impressiion and confus'd Ideas of the Senses.

Reason and Experience are their opposites, for this latter shews, that the Volatile Spirits, and most subtle Bodies frame by their mixture a heavy and solid Body; which the fixt Salts, and other grosser Bodies,  
more

more incapable of motion cannot do, as Chymistry Demonstrates: Nay, Reason convinces us of it, for it's easily conceiv'd, that the grosser and more irregular Particles cannot adjust, or restrain so well, or press themselves with so much strength, as the more fine and regular, in order to the framing a solid and compleat Body.

*Two essential principles towards the generation of the Stone.*

Chymistry discovers to us two essential principles in the Urin, by the Analysis which it has made of it.

The one is a Urinous and Volatil Salt, which much resembles the Spirit of Nitre: And the other a very Æthereal Sulphur, which is like Spirit of Wine.

*Experiment.*

Experience Demonstrates, that if we mix Spirit of Wine with Spirit of Nitre, a coagulum is presently form'd, but these two principles being engaged in the Urine, and it's course not permitting them to Unite together to form the Stone.

*Van Helmont's Opinion.*

The Urine, as *Van Helmont* says, must fall into some disorder before the Stone be form'd, and although the essential principles of the Gravel, in which consists the Seed of the Stone,

Stone, be in the Urine, it needs an intermedium or ferment to excite and cause the Seed to germinate like as in other generations, therefore 'tis a corruptive ferment, says *Van Holmont*, which is sometimes ingendered in the Urine, and which awakes and vivifies the principles of putrefaction, which uniting themselves intimately form the Stone in the midst of the Kidneys.

This is the manner this Author proves it, and we may say to his Credit, that of all who have written on this Subject, none has done better than he.

He says, there's no Transmutative Principle in Nature without Ferment : The Urine does not corrupt in us, because of its motion ; but there must needs be found in it a corruptive Ferment, by occasion of which, 'tis apt for Putrefaction ; so that the Putrefaction is not made by the Urin's being vitiated, but the Reins Suscite the vitious Ferment to the generation of this strange Body : And he supposes, that 'tis the smell alone of the principle of Putrefaction which stirs  
up

*The Ferment of the Stone consists in a smell only.*

up, and separates in Heterogeneous parts, that which before seem'd to be Homogeneous; like as the smell of a Vessel, wherein there has been some acidity coagulates and sours Milk, or as the smell of Leaven Ferments, and infects the Dough, and the smell of a musty Fat, corrupts and Ferments the Wine, even so in the Urine does the Ferment, which disposes to the Gravel, consist in a pure smell only.

It's also observ'd, that the Urine putrifies sooner in a stinking Vessel, in which Urine has been kept a long time, than in one which is clean and new.

He supposes, that the coagulation of the Stone is made in an instant, though its growth is made by degrees, and sometimes all at once.

In the Distillation which he has made of the Urine, he has always found therein a Spirit of Nitre, which he calls a coagulating Spirit, associated with the Spirit of Wine, and though they be both very volatile, they coagulate, as Spirit of Vitriol mix'd with *Sal Armoniac*, which evaporates also very easily.

Be-

Besides this coagulating Spirit, and the Spirit of Wine which meet together in the Urin, he says, there is also found in it a terrestrial Styptick Spirit, which by the means of putrefaction becomes volatil, so that this Spirit of Urine, drinking up the terrestrial Spirit, excited by a putrid Ferment, fuscitates the Spirit of Wine which is in repose, and concentrated in the Urine, which mingling intimately together, and acting one with another, by a reciprocal action, condenses in the middle of the Urine, and forms a stony Matter.

The good or bad use of Food, contributes much to its formation; we observe, that those who use too spiritous Drinks, and dirty Food are more subject to it than others. We see also, that those who live on Milk Meats, Fruit, Pulse, Rye-bread, and several other Impurities, are often tormented with it: The latter contribute to it, because of their Impurity, and the other by reason of their spiritous Particles, the latter furnish the principles of the Stone, and the other the Ferment, which disposes

ses them to putrefaction ; it suffices therefore, that the Urine remain in the Reins by some Obstruction, for to cause the principles of the Stone to unite together, which *FERNELIUS* has well observed, when he said, that Inflammation of the Reins, always preceded the generation of the Stone.

*The Stone  
many times  
Hereditary.*

The origin of the Stone, doth not always proceed from the use of Aliments, it's form'd sometimes through the fault of some portion of putrefying Seed, that's Hereditary, with which we are afflicted all our Life.

*Differences  
of Stones.*

The species and difference of Stones, are drawn from their Figure, Bigness, Consistence, Colour and Situation, which is the reason that we meet with big, little, smooth, unequal, flat, round, oval, square, hollow, light, heavy, hard, soft, such as have Kernels, white, gray, red, black and brown.

Some are movable, others fixt, some stick to the sides, bottom or neck of the Bladder; sometimes they are stopt in the Reins, Ureters, Bladder, and sometimes in the Urethra; finally, there are some found inclosed in a Cistis, others not. The

The signs of the Stone in the Reins *Signs of the Stone in the Reins.*  
 are Inflammation, great pain, (either fixt or wandering) in that region, especially when it's prest with the hand, light Fever, accompanied with suppression of Urine, or at least it doth not flow but by drops, and in little quantity; the Urine is sometimes bloody, especially when there's any vessel broke by the growth of some Gravel, which is form'd and stopt in the Reins, which growing bigger by the addition of some new matter, dilates and extends them so much that they must needs burst. It may also happen by the continual attrition of the Gravel which gather together in the Basen, in this case Clysters are of great use, because *Clysters very useful.* they humect, soften and refresh these parts; they are as a sort of internal Bath, capable of softning the Intestines, to facilitate the slipping down of the Stone into the Bladder, and at the same time to diminish the Inflammation. It's for the same reason that the *Semicupium* is of so great use; if the extravasated Blood be chang'd into Pus, and that the Reins be impostumated, the Urine is troubled and purulent, *Signs of an Ulcer in the Reins.* and often the Matter runs out with  
 F the

*Cause of  
Vomiting  
in Inflama-  
tion of the  
Reins.*

the Excrements, because working on the *Colon*, which is near, it gnaws and corrodes the Tunicles, and after this manner opens a passage to come out this way. Vomiting, and Palsy of the Thigh and Leg, are also concomitant; the Diseased can't stand strait, and the Testicle of the same side retires into the Groin. The Vomiting proceeds from the mutual communication that is between the Nerves of the Kidneys and Stomach, by the Irritation of the Spirits in the carnous *fibres* of the Stomach, occasioned by the Inflammation of the Reins.

*Cause of the  
Palsy of the  
Thigh, &c.  
in Inflama-  
tion of the  
Reins.*

To give a reason for the Palsy, you must observe that the Kidney is laid upon the head of the Muscle *Psoas*, which it presses and inflames; this Muscle being inflamed, also presses a thick string of Nerves which passes through its body, and distributes it self into the interior part of the Thigh and Leg, from whence follows the *stupor*, by the suppression or obstruction of the Spirits. After this manner the Muscle *Psoas* reciprocally inflames the Iliac to which it's join'd; and seeing these two Muscles serve to bend the Thigh, it can no more obey nor follow the

the action of these Extensors, which is the cause that we can't stand upright without cruel pain.

The Testicle retires into the Groin, by reason the Iliac Muscle is join'd to the Cremaster's, which embraces the body of the Testicle, so that its fibres being shortned by the Inflammation, (which the Iliac communicates to it) the Testicle must necessarily mount into the Groin; nevertheless all these Signs are equivocal, seeing they may happen in the ordinary Inflammation of the Reins, that is to say, in the Nephretic Colic.

*Cause of the contraction or shriveling up of the Testicle into the Groin.*

The Signs of the Stone in the Bladder, are passific burning pains in the time of making Water, the Urine comes out by drops and reiterated turns, as in *Stranguria*; and as the Bladder is emptied and diminished in bigness, its sides apply themselves so hard against the surface of the Stone, which if it be rough, it fails not to cause sufficient convulsions, and break some vessels, in which consists the burning pain one feels after pissing, and the last drops are often bloody.

*Signs of the Stone in the Bladder.*

The Water is made by turns, because the Stone which lies heavy on the neck

*Causes of  
these Signs  
of the Stone  
in the Blad-  
der.*

of the Bladder, stops partly the passage of the Urine ; but the worst is, that in the time of pissing, and when the sides ( which before were extended ) come to touch rudely against this rough body, its nervous *fibres* break, and gives way to the Urine, by its acrimony to prick them, so causes convulsions, cruel and pungent pains, and imprints on the spirits an irregular motion, by occasion of which the carnous *fibres* contract and embrace the Stone faster, the diseased thinking in that moment to ease himself, and desiring to suspend the course of the spirits, augments on the contrary the violence of the pain, and retards the course of the Urine , and so causes some of it to remain always in the Bladder , which grows acid , and at length becomes stinking by its stay there , so renews much sharper and insupportable pains.

*Cause of  
Itching.*

One feels an Itching in the region of the *Perineum*, which irritating the sphincter of the *Anus*, excites a *Tenesmus* ; the Itching continues even to the extremity of the Gland, which obliges the Patient to rub it often.

The

## Chap 18. *Of the Stone.*

105

The Heaviness about the *Perineum* can't proceed but from the weight of the Stone, and the itching from the acrimony of the Urine. Sometimes there happens a Priapism, or an involuntary erection of the *Penis*, caus'd by the irritation of the *fibres*, and inflammation of the bladder and *urethra*, which communicates it self to the cavernous bodies; It's easy to see that the irritation of the part (join'd with some slight indisposition) can awake and hasten the course of the blood and spirits design'd for the functions of the Yard, and adjacent muscles, which being swell'd by the spirits, compress the veins which are distributed in it, to hinder the return of the blood; the blood and spirits filling all the *vacuum*, or empty spaces of the hollow bodies; the Yard must needs grow stiff, and extend it self.

*Cause of  
Heaviness  
about the  
Perineum.*

We observe that the Urine is sometimes white, sometimes bloody, troubled and muddy, and is charged with a mucous and sandy sediment.

*HIPPOCRATES* in his Aphorisms reports, That when the Urine is extreme clear, and you find Sand in the bottom of the Urinal, it's an infal-

*A certain  
Sign of two  
or more  
Stones in  
the Blad-  
der.*

lible mark of the Stone's existence in the bladder. When the Stone is smooth, it's a sign that it's accompanied with some other Stones, which by their continual attrition become polished and smooth. If the Stone be big, and lies heavy on the neck of the bladder, it dilates in such a manner, that in time it grows as big as its bottom. If it adhere to any part, or is contain'd in a *cistis*, the Patient may carry it all his life without any detriment, or manifesting any of the signs which we have spoken of, especially when it's suspended at the bottom of the bladder.

*An Obser-  
vation.*

*VAN HELMONT* assures us, that he knew a Priest, who going to reach a Book in his Library, at the same moment felt a great weight in the Hypogastric Region, which was presently followed with all the Symptoms we have describ'd, 'twas the Stone which was then separated from the bottom of the bladder, ( by this simple effort ) so that he was obliged to come to the operation; but the most sure and certain sign of the Stone is the Probe, which convinces us of it, by the resistance it makes, and noise which

we

we hear when we strike upon it; this is also the sign which causes the necessity of the operation, if the age, season and strength of the Patient permit.

Here it is where Mountebanks triumph, who, by their Impostures, endeavour to persuade People that they have infallible Secrets to dissolve the Stone in the Reins and Bladder; these sweet hopes flatter the minds of those who are troubled with it; but when we shew them by evident demonstration, that the most violent and caustic Acids, as *Aq. Fortis*, *Spirit. Nitri*, &c. cannot dissolve it, we make them know also, that if ever these Impostors had any Medicines capable to produce such Effects, without altering any part before they were past the Stomach, Intestines, Receptacle of the Chile, Heart, Lungs, and in the most insensible ways where they mingle with the Blood and Humors, they would doubtless lose their quality and dissolving vertue; therefore there's nothing can free us from such a cruel Disease but the operation, after having used general Remedies, as Bleeding, gentle Purgings, and Clysters, unless the Stone be of an

*No Medicine so powerful as to dissolve the Stone.*

*Nothing can free us of the Stone but the operation.*

extraordinary bigness, and there be a complication of Diseases.

*Prognostics.* If the Stone be of a moderate bigness, the operation is less dangerous; if 'tis big, and stick in the bladder, it's more to be fear'd, because of the rupture of the vessels, and of the great laceration it causes to the parts, which is always accompanied with Inflammation, Convulsion, Fever, Gangrene, and often Death; especially in young, who are not over Nine years of age, and whose parts are soft and tender; or in old, whose parts are dri'd up, and inflexible as it were, through the little heat and humidity which we find in them.

If the Bladder be ulcerated, and there be any great Hemorrhage, or some Carnosity, you must avoid the operation, all these Particularities belong to the Prognostics of the Disease; you must observe that these sorts of Subjects often relapse, and if the operation were not reiterated, you would find a Quarry in their Bladder.

## C H A P. XIX.

*Of the Extraction of the Stone.*

**H**AVING thus consider'd the precedent Circumstances, you may hazard the Operation; but before, it's necessary to stir the Stone by some motion, and to empty the Bladder of its Urine.

Place the Patient on the brink of a Bed, his back on an even sloping board, his thighs open, knees near his belly, his heels drawn up to his brich, and his hands hanging down on the sides of his ankles.

*The Situation of the Patient in the operation.*

To keep the Patient in this posture, you have a band with which you support the thigh, lower end of the leg and hand, and after some turns of the band, you pass it upwards about the shoulder, and slipping it behind the back, you repass it about the other shoulder, to bind the hand, leg and thigh of the opposite side: this posture is very proper to execute this design; for it upholds the bladder, and gives liberty to the muscles of the Ab-

domen to relax and bend, as they formerly did.

The manner  
of cutting  
for the  
Stone by  
the Aparatus  
minor,  
or Gripe.

The place  
where the  
Incision  
must be  
made.



The Patient being in this posture, the Chirurgion disposes himself to the operation ; if it's by the little *Aparatus*, ( which is not so much in use ) he wetts his *Index* and middle finger in some oil, or other unctious matter, and introduces them a little obliquely into the *Anus*, not stretching them, till he has prest gently the *Hypogastrium* with the other hand, then the Operator endeavours to push the bottom of the bladder towards its neck, to place it faster between his fingers, and the *Os Pubis* ; having fixt it, the Chirurgion with a Bistory cutting on both sides, makes an Incision on the Stone according to its bigness, on the side of the *Raphe*, and between the *os pubis*, about two fingers breadth from the *Anus*. The Incision being made, you extract it with fitting Instruments, of which we'll speak in the Great *Aparatus* ; sometimes it will slip out of the Orifice, by only pressing the fingers a little forwards towards the Orifice : so much for the lesser *Aparatus* ; for seeing we can't use it without making the Intestine and Bladder very livid, nor often without  
enda-

endaming them, we ought to reject this method, and prefer the Great *Aparatus*, of which we will give the description.

After we have regulated all that pre-  
cedes this so important an Operation,  
and having plac'd the Patient in a con-  
venient posture, the first thing we must  
propose to our selves is to search him  
well.

*The manner  
of cutting  
for the  
Stone by  
the Great  
Aparatus.*

As for Probes, you ought to have  
some great, small, and middle-sized  
ones, for all sorts of Ages; strait and  
crooked for both Sexes, with *canulas*  
garnished with a fillett, to empty the  
bladder of the urine, and others hol-  
low, as a Directory to perform the  
Operation with; you may use the  
Probe or *Catheter* divers ways.

*Several  
ways of  
using the  
Catheter.*

In the first, the Chirurgion takes  
with his left hand the top of the Yard,  
( dilating its passage a little ) and pulls  
it upwards, that the chanel of the  
*urethra* make a strait line, to facilitate  
by that means the entry of the *Cathe-  
ter* into the bladder; all the difficulty  
consists in introducing it methodically,  
which is, that the extremity which is  
held in the hand be outward, and the  
convexity inward; and as its point  
approaches

approaches towards the neck of the bladder, you give it half a turn, by which means you make it slip under the *Os Pubis*, and cause it to enter into the hollow of the bladder, so that its point is within, and its convexity without.

*Second way  
of Probing.*

The second method is much more easy, and less troublesome, because you introduce the Probe quite contrary to the former; and without giving it a turn, you make it slip into the bladder.

Good Probing is not only necessary for extracting the Stone, but also in all carnosities and inflammations of the bladder; it's of great use as often as the Urine is supprest in its passages, and very often one perishes in all those occasions, for not knowing how to probe well.

*How to perform the  
operation  
methodically.*

To make the Operation, you use a hollow Probe, which being in the bladder, the Chirurgeon must bring it to the side of the belly, that its convexity may press the interior surface of the *Perineum*, and make it rise in a hillock, and whilst the Servant holds up the Yard, and top of the Probe with his left hand, and the Testicles with his right,

right, the Operator, with his thumb and forefinger, fastens the most eminent part of the Probe to the right side of the *Perineum*, and with a Knife cutting on both sides, he makes an Incision all along the hollow, more or less great, according as he judges the bulk of the Stone to be. To make the Incision regularly, he holds the Instrument like a Lancet, beginning to pierce the most elevated part of the *Perineum* still to the hollow of the Probe, which serves to the Knife as a Directory, and without any stop pass and repass it several times over the surface of the Probe, till it be quite discover'd, lest you make divers Incisions on the bladder. Before you withdraw the *Catheter*, feel with your finger, to know whether there remain any adherence which might hinder the entry of the Conductor, introduce its extremity into the hollow of the Probe as low as possible, the Conductor being as it were engaged in the Probe, as you withdraw it softly out of the bladder, you push your Conductor, and make it follow the motion of the Probe, otherwise it might escape sideways, and the Operation would not succeed

succeed with the success one would desire ; when you'r sure that the Conductor is in the capacity of the bladder, you slip over its surface strait or crooked pincers, then withdraw your Conductor, and search dexterously for the Stone on all sides without violence, then take hold of it ; if it's fastned or sticks, you turn softly your hand on both sides to break the ties which hold it, without causing Contusion or Hæmorrhagy.

*What's to  
be done  
when it  
sticks to the  
bladder.*

If the Stone strongly adhere, you must not offend the bladder, but move it moderately ; if your ties be too strong, you must use the toothed crow's-bill or incisive pincers, always taking care lest you offend the bladder.

When the Stone happens to be too big, enlarge the Wound with the Bistoury, and reject the use of the *Dilatorium*, by reason of the great Contusions it commonly leaves in the parts.

*What's to  
be done  
when  
any urgent  
Symptoms  
happen in  
time of the  
Operation,*

If any Accident should happen in the time of the Operation, as Hæmorrhagy, Syncope, or any other troublesome Symptom, the Chyrurgion ought rather to correct them, than finish the Operation, and so leave the Patient in  
repose,

repose, till he has got new strength, and the Accidents are ceased ; for having deferr'd the Operation after this manner, the Stone very often presents it self at the orifice, and the Cure is much more easy and successful.

When the Stone is extremely smooth, 'tis a sign that it's not alone ; then search, and being convinc'd, you extract them with the Pincers. If the Patient has violent pain, use Injections of milk, or other Anodines ; when the Stone is rough and unequal, and signs of Excoriation appear, use Detensives made of Whey, *Decoct. Hord. Plantag. cum Syrup. de Rosar. Sicc. & similia.*

If the *Scrotum* be livid, and there be sign of mortification, make use of the most violent Resolutives and Defensives ; when the Stone is extracted, put in the Spoon, to cleanse it from the gravel and grumous blood which might be there, lest by any stay it might cause some disorder: Having discharg'd the Bladder of these strange bodies, if the orifice be over-large, you may make some stitches, and leave a space to put a little tent of lint in,  
( tied

*Tents of  
Lead or  
Silver not  
to be used.*

(tied with a thread) in case you suspect that there might yet be any clods of blood, or some reliicks of the Stone; never use those tents chanel'd with Lead or Silver; for their contexture being too close, cannot soak in, or imbibe any particles of the sharp juice, which ordinarily runs from the lips of the wound; and since we know that the calosity of any Ulcer depends only on the action of a saline and pungent liquor, as we shall prove, when we speak of Fistula's, we must not be astonish'd that the wounds where these kind of tents are introduced, degenerate always into a fistulous Ulcer; whereas the Lint, whose contexture is very spongy and loose, soak up, and charges it self with the points of the Salts and Acids, so by this means hinders a wound from growing callous: But if you'r sure that there is no strange body, the use of tents is absolutely needless; you only apply some bouldsters, plaister, compresses, and the bandage, after that you dress the wound as a simple one, and to hasten the reunion, you make the Patient lie cross-leg'd, and tie his two knees together; some lay under the Patient's britch

britch a little bag full of bran, to hinder the Urine which runs out from heating or fretting the skin of the parts.

If the Urine by its weight should carry along with it some little Stone into the *Urethra* which stops its passage, the Urine endeavouring to escape sometimes, draggeth the Stone along with it; but if its largeness doth not permit it, the stream of the Urine forceth it to dilate, and extend the sides of the *Urethra*, which causeth a ruption of the vessels, upon which followeth pain and inflammation.

If in this Accident you cannot get it out, place it between your fingers, and make an Incision ( according to the length of the Yard ) upon the body of the Stone, which you must extract with a fitting Instrument, then you close the wound, by the help of an uniting bandage, and other remedies.

*How to cut  
the Stone  
from the  
Urethra.*

It's true Women are sometimes troubled with the Stone, but not so often as Men, because they have those passages more open, not so crooked, and less long, so by this means the Urine by its stream precipitates easily  
the

*Women not  
so subject to  
the Stone  
as Men.*

the little gravels which gather together in the bladder, not giving the ferment time enough to produce its effect, which is the cause that they are much less subject to it; however if the Probe, and the other signs convince us of its existence, you must undertake the Operation.

*How to extract the Stone in Women.*

The Probes which we use for Women are strait, only a little crooked towards the end. If the Stone be little, you may extract it with the finger or spoon. If it be big, make a little Incision at the upper part of the *Ureter*, to introduce the little duck's bill, to facilitate therewith the extraction. As for the suppression of Urine, and all other circumstances that regard the Operation, you have nothing to do but to imitate the method which we have formerly given. I will only say, that we know the Operation to have good success, when the Patient rests well, has free respiration, tongue moist, thirst moderate; little or no pain; Fever, but moderate; no swelling in the Hypogastric region, and the Inflammation abates on the fifth or sixth day.

*Signs of good success in the Operation.*

## C H A P. XX.

*Of the Fistula in Ano.*

**B**Y a Fistula, we understand a calous, deep and cavernous Ulcer, *What a Fistula is.* which from a narrow entrance, ends in a large and spacious bottom, yielding ( for the most part ) a sharp and virulent matter.

Fistula's possess indifferently all parts of the body, especially the *Anus*, breast, *Os Lachrima*, Joints, all spongy parts *What parts are most subject to Fistula's.* loaden with fat, and humected with many humours; all nervous parts, or at least such as are quite destitute of flesh and fat, from whence it comes that wounds, which penetrate to the bones, almost always degenerate into Fistula's.

If Wounds happen in spongy parts, it's easy to conceive that nothing hinders the humours from finding out passages, and altering various parts, which is distinguished by the colour, consistence and acrimony of the matter that flows from them, which makes all the difference of Fistula's.

The

*Cause of  
Fistula's in  
general.*

The cause of Fistula's in general, almost always proceeds from a winding Ulcer, which is form'd and nourish'd by the most sharp and salt particles of the blood.

*Causes of  
Fistula in  
Ano.*

The cause of those which happen to the *Anus*, ( whose nature we are Here to explain ) are Internal, or External.

*External  
Causes.*

The External come from some Wound, as from Leeches ill appli'd ; or from some bruise, whether by riding, or by some other vilanous exercise, as Buggery ; or finally by some fall, or any other violent motion. It's evident that all these Causes must hinder the Circulation of the Juices, and give way to Impostumation, which in a short time degenerates into a Fistula.

*Internal  
Causes.*

The Internal, are ordinarily Consequences of Obstructions, Inflammations, Ulcers, Hemorrhoids, and Impostumations.

*Why the  
Blood is  
more easily  
obstructed  
here than  
in other  
parts.*

Now our business is, to give Reasons why the Blood stops more at this part than at any other, to produce these kind of Accidents, of which Fistula's are troublesome Consequences.

To have an Idea of it, it's necessary to examine some Circumstances which depend on the structure of the part.

The

The first consists in the disposition of the *Intestinum Rectum*, and in the temperament of its neighbouring parts.

*First.*

The second regards the nature and multitude of vessels which water it, and the abundance of humours which they carry along with them.

*Second.*

The *Intestinum Rectum* is every where encompassed with fat two or three fingers thick, especially in full and fat persons, which makes the extravasated Juices more easily penetrate these parts to attack the Gut; which is a part very subject to alteration, by reason of its great humidity, and number of vessels that enter into its substance.

*Structure,  
Sec. of the  
Intestini-  
um  
Rectum.*

We know that the Arteries, and Hypogastric Veins furnish it with two branches each; the *Aorta* gives it one branch of an Artery which comes from that part where it's divided into the Iliac; and the inferior mesenteric Artery another, besides the Hemorrhoidal Veins, one of which come from the splenic, and the other from the mesenteric. It has also many lymphatic vessels, and several glands that separate a white and viscous humour, which lines its interior surface, and defends it against the acrimony of the Excrements,

*The Vessels  
of the In-  
testinum  
Rectum.*

ments, and other Levens; these are the different vessels which water the *Intestinum Rectum*.

Now it's easy to understand from all I have said, that the Circulation of the Humours must be very slow in that part, because they remount against their own weight, and are deprived of the motion of the muscles, which is of great use to hasten the Circulation of all the Juices; so for any little propensity they have to stop, and be corrupted there, (if by chance any of the External Causes, which we have spoke of, contribute towards it) they never fail; if so be it comes from the Veins, to cause the Hæmorrhoids; Inflammations, and Impostumations, if from the Arteries; and Excoriations, and Ulcers, if from the Lymphatic Vessels and Glands. And as these parts are extreme penetrable, if the blood acquires any malignity or ill quality by its fermentation, nothing hinders but it opens it self a way, and finds passages to attack sometimes the gut, sometimes the flesh, sanguiferous vessels, nervous parts and bones; and finally, to produce the diversity of *Fistula's*, which we call strait, oblique, or winding.

ing. When the Fistula is in the flesh, the Pus that comes out of it is thick, muddy, course and viscous.

*Signs of  
Fistula's  
in divers  
parts.*

If it attack the nervous parts, you have pungent and violent pains, and the humour which flows from it is sharp and serous ; if the matter of the Fistula move towards the sanguiferous vessels, and break any of them by its acrimony, its colour is like the washings of flesh ; if the Fistula penetrate to the bone, and it be altered or rotten, the matter which comes from it is clear, thin, and in its highest degree of acidity.

We likewise observe, that in these kind of Fistula's, the calosity is much more considerable than in others ; for as all the world knows that the calosity of a Fistula depends only on the presence and action of a sharp and salt juice-like Brine, you must not be astonished if those that reach the bones ( which are nourished with a humour that's extremely salt and pungent of its own nature ) be so calous ; for from the moment that the sides of an Ulcer are water'd, and humected with an humour like it, if its *intemperies* be not corrected, its points creep insensibly

*A salt and  
sharp juice  
the cause of  
calosity.*

bly into the bottom of the Ulcer, and after several punctions, these little needles ( which we must consider as so many wedges ) enter, and fix themselves so into the porosities of the flesh and membranes, that they render the Ulcer so hard and calous, that it turns into a Fistula.

*Prognostics.* As for the Prognostics of Fistula's, I say in general, that those which are new, which happen in a good temperament of body, are well conditioned, and that possess such parts where Medicines may be easily appli'd, are curable.

But on the contrary, if they be old, the Party Cachectical, when they possess such parts as are necessary for life, as the Bladder and Intestines, incurable. Lastly, all Fistula's which attack the Bones, Tendons, Arteries, *Vertebra's* of the Back, Breast, Belly, Paps, *Axilla*, Groins and Joints, are doubtless difficult to overcome.

*Where Palliatives are convenient.*

Some Fistula's are cured by caustic Medicines, others by Iron; some, where Medicines are not able to vanquish, need only Palliatives, or such as are proper to stifle and check the violence of the effect, and prevent more troublesome

some Accidents. Finally, there are some which reduce the parts to such a languishing and deplorable condition, that they being unable to perform their ordinary functions, we are obliged to amputate the parts, as those in the Joints, unless it be in the *Axilla*, or other parts where the Operation cannot be perform'd. In such dangerous Affects, we are to have no other aim, than to mollify by all means the Humours which foment and nourish them; being they threaten death in all Subjects.

The *Anus* is liable to several sorts of *The Anus*  
Fistula's, whose knowledge mightily *subject to*  
favours their Cure. *several*

The first is, when it pierces the Bo- *sorts of*  
dy of the Intestine, and hath no out- *Fistula's.*  
ward Aperture.

The second openeth outwardly, and hath no communication with the Intestine, or hath only slightly touched its *superficies.*

The third, which is call'd complete, manifests it self both outwardly and inwardly.

The fourth is of several Burroughs, or Sinusses, which discharge themselves into a *Sac*, which is as the concurrence of all.

G

The

*Signs of  
the first  
kind of  
Fistula.*

The Signs of the first kind, are a little outward swelling, accompanied with a slight Inflammation; the matter runneth with the excrements, or after them, with pain and excoriation of the Intestine and *Sphincter*, Itching, *Tenesmus*, and Inequality of the Aper-  
ture.

*Causes of  
these Signs.*

The swelling is caused by the obstruction, compression, expression of the *Pus*, and the efforts which the excrements make at the passage; and if by its stay there it be grown acid, and hath contracted any malignity, it causeth divulsions passing over the surface of the Intestine, which excites pain and inflammation.

But on the contrary, if it stay there, hath not as yet corrupted it, and that it hath (in a manner speaking) only entred into its first state of alteration, it excites but slight divulsions, in which consists the itching.

This same matter acting upon the fibres of the Intestine, rout the spirits, which being irregularly carried into its carnous tunicle, *sphincter*, and *musculi levatores*, the Gut is obliged to empty it self of the little excrements it contains.

But

But in the time that the carnous tunicle by its action precipitates and expels the exciements, the *sphincter* and *levator*es shut and stop so exactly the passage, by means of the irritated spirits, that they oppose their coming forth, and force them often to remount, in spite of the action of the muscles, of the *Abdomen*, and carnous tunicle of the Intestines, which causeth the *Tenesmus*.

The Signs of the second sort of *Signs of the Fistula*, are known by the Probe, and *second*. matter which comes out of the Fistula.

Those of the complete, are the same *Signs of the* which we have related in both the *third*. foregoing *Fistula's*.

The Signs of that which are with *Signs of the* Sinusses, are pain, abundance and dif- *fourth*. ferent changes of the matter which flows; but the surest Sign is the Probe.

## C H A P. XXI.

*Of the Operation of the Fistula  
in Ano.*

**I**N the Operation of the Fistula *in Ano*, of what kind or nature soever it be, you always observe the same Rules and Maxims.

*How to per-  
form the  
Operation.*

First, You place the Patient on the brink of a Bed, laying him on his belly, his legs straddled; you dispose a bandage about his body in shape of a T. if it be a Fistula that openeth inwardly, you introduce, if possible, the Styler, or Probe, through the passage of the Intestine, and slip it all along the Fistula to the bottom; when you find with your finger the end of the Probe outwardly, make a little carved Incision over it, that the end of the Probe may come out; bend it a little, and cut, not only all that the Probe embraces, but also a little under the bottom of the Fistula, that the re-union be more easily perform'd. If so be you can't pass your Probe through the Intestine into the Fistula, you make the Incision outwardly

outwardly on the Tumor, as we have prescrib'd, that the Probe may be easier introduced and pass'd into the Intestine.

If the Tumor be somewhat 'distant from the brink of the *Anus*, you must prefer a potential Caustery before the Bistory, for to lessen the pain. *When a Caustic is to be used.*

If the Fistula anticipate the breadth of four Fingers upon the body of the Gut, and that it openeth above the *Levadores Ani*, you must not hazard the Operation, for Reasons which we will alledge hereafter. *When the Operation is to be omitted.*

In the Fistula which opens outwardly, you pass a Stilet through your Aperture, and pierce the Intestine, and make it come out of the *Anus* to bend it, or make a Handle, as hath been said.

Some in a Fistula make use of Scissors, and others of a narrow Instrument like a crooked Bistory, whose edge is arm'd with a sheath of Tin, you introduce it through the orifice of the Fistula, and passing it through the orifice of the Gut, you cut at one slash the whole bottom of the Fistula; if the Calosity be considerable, you scarify the sides and bottom: the most

*Vitreole's  
to be re-  
jected.*

to be fear'd are the Arteries ; but if by misfortune you should have cut any of them, you must use some stiptic water, or the ligature if you can, and reject the vitriolate Button, because of the Intestine.

The Operation being made, you introduce your fingers into the Fistula, to find if there be any adherence or sinusses, which must be loosen'd, and open'd with the Scissors, ( as well to facilitate the entrance of Medicines, as to give passage to the Matter which lurks there, and which would in time serve for a new Ferment to produce new Fistula's ) avoiding always the Arteries, which are felt by their continual pulsation.

*Objection.*

Now the Question is, How the Excrements must be kept back, if the *Sphincter* be wholly cut away?

*Answer.*

For to be convinc'd of it, you must only represent to your self the disposition of the *musculi levatores*, which by their union form a kind of ring, that embraces fast the body of the Intestine, performing the same office as the *Sphincter*. Moreover, I say that the *Fibres* of the *Sphincter* being cut, every *Fibre* coming from each point of the  
Cica-

Cicatrice, as those of the *Sphincter* from the Bladder, and from all the other, may, in contracting themselves, perform still the same office as before, provided much of its substance be not destroy'd by too great suppuration; for seeing these parts are extremely spongy, there might be such a considerable passage made, which would cause the Excrements to come out against our Will; this being explain'd, you fill the Wound with a thick Dressel, tied with a thread, dress the rest with Pleagets, sustain'd with a Plaster, Compress and Bandage, of which we have spoken.

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## C H A P. XXII.

*Of the Empiema.*

*What an  
Empiema  
is.*

**W**E understand by the word *EMPIEMA*, a collection of matter and blood in the capacity of the Breast. It's taken sometimes for the Operation, and sometimes for the Disease; and tho *HIPPOCRATES* hath given it a larger extent, when he said that it might be taken for every heap of *Pus* in what part soever, notwithstanding it's certain, that it's only proper to this part alone.

*Difference  
of Empi-  
ema's.*

The differences of *Empiema's* are drawn from the place where the matter lieth, and from the different Accidents which accompany them. Concerning the place of the matter, it lieth between the *Pleura* and the Lungs, or in the substance of the Lungs it self, both these proceed from an internal or external cause; from an internal cause, as an Impostumation formed in the Duplicature of the *Pleura*, or in the substance of the Lungs, which breaks and runs upon the Diaphragme. From an external

external cause, as a wound, or from a vessel broke, by some fall, blow, &c.

You must observe that the Pus and Blood do not always fall upon the *Diaphragma*, by reason of the adherence which the Lungs contracts with the *Pleura*, so that they can communicate their inflammation and alteration to one another; and that the matter may pass from the Lungs, through the aperture of the wound, without one drop of it being spill'd in the cavity of the breast, which is to be well examined before you separate the Lungs from the *Pleura* with your finger or Probe, (as most Practitioners are wont to do) that is to say, if the matter run with ease through the Aperture, and without the *Diaphragma* being oppressed with it, you must no ways break the adherence of them.

*The Matter doth not always fall on the Diaphragma.*

I do not speak here of diseases of the Throat; we know well enough that never an *Empiema* succeeded a Quinsy; the reason is, that the Pus cannot fall upon the substance of the Lungs, without causing a sudden suffocation, because the Pus, by its weight, would hinder the play of the vessels that compose them; wherefore there

*A Quinsy can never cause an Empiema.*

is only Plurifies and Impostumes of the Lungs, which precede the *Empiema* that comes from an internal cause.

*Causes of a  
Plurisy.*

As for the cause of a Plurisy, some say it's form'd by a boiling and impetuous blood, which is extravasated in the *Plura*; others pretend it's caus'd by a bilous blood, which gathers and putrefies between the ribs and *Plura*.

Some others maintain that it proceeds from an extravasation of blood that comes from the intercostal veins, and the *Aziges*; which is discharged between the duplicature of this membrane, where it changeth into *pur* by its stay there: though this last opinion be not over-well grounded, yet it is the most common, and most received.

It were to be wish'd that all these opinions were as true as they are authorized by their Partisans; for besides, that the blood being ordinarily spilt out of the vessels only after some blow or wound, it's evident that the bilous particles are rather capable to dissolve a matter than coagulate it, and that it's only the salt volatil alkalies of the Bile which tend to the exaltation; but there must needs be here a coagulating Agent, which disposeth it to be obstructed.

fructed in this membrane. There is nothing more common, than to see *A common Cause of Plurifies,* in the Summer-season Plurifies affect those, who having over-heated themselves by running, or some other as violent exercise, go imprudently to drink Iced Liquors, or in a Cellar to cool themselves, having most commonly their Breast open. You must consider, that in the same moment the Pores being much dilated, the blood is in an extraordinary agitation, and furnishes abundance of Swetts; this being so, it happens that at the same time as this cold drink chills, (as it were) the blood in the vessels, the impression of the external cold Air suppresseth the Swetts, in shutting up the pores, and they being quite disengaged from the rest of the mass, stop in the duplicature of this membrane where they coagulate the blood, by the means of their urinous volatil Salt.

Experience teaches us, that there is *Urine and Swett analogous.* no liquor in the body has more analogy with the Urine than Swett; we observe also that it hath the same taste, smell, and consistence; we know that the Urine abounds in a urinous volatil Salt, and in a very ætherious Sulphur.

New.

Now I say that these two spirits, (which are found in the Swett as well as Urine, whose nature and property we have explain'd elsewhere) hapning to be united together in the *PLURA*, in the time of the suppression of abundance of Swett, are very capable to condense the blood, and cause the Plurify, which *HIPPOCRATES* hath well observed, when he says that cold things, as Snow and Ice, are Enemies to the Breast, and that they excite Coughs, Dysenteries and Fluxions; *Frigida veluti nix & Glacies pectori Inimica, tusses moverit, & sanguines fluxiones, & distillationes movent.*

Sett. 5.  
Aph. 24.

He says likewise, that the *Scythians* do not live long because they drink Ice waters; and that the frequent use of these waters offend the Breast; for the same reason says *HIPPOCRATES*, Plurifies happen most commonly in the winter-time; as also *Peripneumonia's*, Coughs, pains of the breast and sides; *Hyeme plureides, Peripneumonia, tusses & pectoris Laterum Dolores.*

Sett. 3.  
Aph. 23.

It's commonly observed, that those who expose their breast to the Air in the beginning of hot weather, are almost always troubled with a Plurify;  
the

the reason of it is evident, if we make reflection, that no part of the body is so deprived of flesh as the breast, which is the inclosure of the treasure of life, and which consequently is sooner penetrated by the Air; wherefore those who take care to cover at all times their Breast well, are much less subject to Plurifies, and many other diseases.

The cause of a Plurify doth not always come from having put your self into a heat, or exposed your self to too great a cold; but it comes often from an Air too much loaded with nitrous and sulphureous Particles, which we attract in inspiration, and which produce the same effect as the principles which we have said are found in the Swett.

Those kind of Plurifies which we call Popular, or Epidemical, happen oftner in Countries where the Earth abounds with Nitre and Sulphur; and where the heat is excessive, as in Meridional Regions.

The constitution of persons contribute much to its formation; those who are of a quick wit, whose blood is subtil, and are of a tender Complexion,

*A Plurify  
often from  
a nitrous  
Air.*

*Who most  
subject to a  
Plurify.*

plexion, are more subject to it than others.

*An Observation on the blood of a pleuretic person.*

It's observable, that after having bled a pleuretic person, there is a little skin form'd on his blood like glue, and almost of the same consistence, which has a kind of spring, or elastic vertue; for when ever you handle it with your fingers, it resists a little, and returns into its first posture; it swims upon the blood, even as certain little flanks swim upon the urine of those troubled with the inflammation of the Reins.

*Prognostics.*

As for the Prognostic of this Disease, it is always very dangerous, when Bleeding and general Remedies do not dissipate the Tumor. *HIPPOCRATES* says, that if one spit from the beginning, the disease will be short; but if one spit not till some time after; it will be long: *Velut in Pluretide laborantibus, si sputum statim appareat inter initia ipsam abbreviat, si vero postea appareat producit.*

Yet this Rule is not always true, because there are some that do not spit, and yet recover in a very short time; whether that the Humor, which causeth the obstruction, be dissipated by

by insensible Perspiration, or by the way of Circulation, according to the vertue and operation of the Medicines which are used in this Disease.

The most specific Remedies to hinder the progress of this Disease are Bleeding, which keeps the first rank; and I say, that if it be of any use at all in Surgery, it's without doubt in this occasion, because in emptying the vessels, it hinders the Blood from being carried so abundantly to that part, and must consequently lessen the bigness of the Tumor, in diminishing the quantity of the Blood.

*The best way of curing a Plurisy.*

*Bleeding no where of so great use as here.*

The other Remedies are those which rarify, subtilize, and attenuate the Blood, as Horse or Mule's dung infused in White-wine, old He-goat's Blood in Powder; all Volatil Salts, and several other Remedies of that nature. The decoction of Nettles in strong Wine, which you sweeten with Sugar, is also excellent; you may at the same time you take the Decoction, lay on the sides the bruised Nettles in form of a Cataplasme.

*Approved Remedies in a Plurisy.*

Having thus in general explain'd the Cause of a Plurisy, I am obliged to say something of a *Peripneumonia*, that

*Of a Peripneumonia.*

that sometimes proceeds from an Impostume of the Brain, or from the Inflammation of some Membrane which changes into an Abscess, as experience demonstrates in those that die of great Wounds of the Head; but for the most part it's caused by the corruption of the Blood, that is to say, by the exaltation of its sharpest Particles. All the difficulty is, to know why the Pus, or Blood, stops rather in the Lungs, than in any part else, for to make an Impostumation; I say, that three Causes contribute to its formation, the alteration of the Blood, long and slow Respiration, and the structure of the part.

*Causes of  
Peripneumonia.*

*First Cause.  
Alteration  
of the Blood.*

Concerning the first, you must only make reflection on the nature and mixture of the Chile, and thickest Blood, which the right Ventricle of the Heart sends in every Sístole to the Lungs, through the Pulmonic Artery. We know that these two Liquors pass through the Heart and Lungs, for to receive some necessary preparations for the function of the parts; therefore we may say that they are the two receptacles of all that is most thick and indigested in the mass of Blood; but if  
the

the Heart hath the strength and power, by its constriction, to subtilize, and cast off all that is most heavy and material in the mass, the Lungs have not the same advantage, as we will prove; so that the grosser substances being accompanied with some impurity, and having only felt the first effects of the Heart for its perfection, it must needs stop there, and putrefy.

The second Cause which I establish, is a long and slow Respiration. It's certain, the more free the Air enters into the Breast, and the more the Vessels are extended, they are in a more fit condition by their elastic vertue or spring, to express the Air through the Pipes of the *Trachea Arteria*; and the more the Blood is agitated by the inspiration of the Air, it's driven with greater quickness into the Veins: But on the contrary, if the Blood is moved slowly by a long Respiration, it follows that the Vessels being not so extended as they should be, and not expelling the Blood out of them with such a violence, it stops and corrupts there gradually, by the arrival and mixture of some ill Leaven, or by the exaltation of its salt Particles; from whence

*Second Cause.  
Long and slow Inspiration.*

whence it comes, that those who have a long Neck, are more subject to it than others, because the Air is obliged to make a long traverse before it comes to the Lungs, which makes them dry up, and alter insensibly.

*Third Cause on the Structure of the Part. What the Lungs really are.*

The third Cause is grounded upon the Structure of the Part; the Lungs are a complication of little Vessicles, in which the Arteries pour the Blood, and where it's mingled with the Air, to receive some alteration there. Now it's shew'd in the Hydraulic's, that a Liquor which passeth from a little Pipe into a greater, loseth much of its motion; and being the Arteries are very little, in proportion to the Cells, it's no wonder if the Blood grow slow there, and changeth its nature by the exaltation of some sharp and tartarous Salt, and by the Fermentation which they cause there; wherefore the alteration of the Blood, the irregularity of Respiration, and the largeness of the Vessicles of the Lungs, in proportion to those of the Arteries, are the three Causes that concur to the formation of the *Peripneumonia*.

Since

Since the Signs of all these kinds of Diseases are of the greatest importance to succeed well in the Operation, and to make a favourable or dangerous Prognostic, I will endeavour to describe them with all the Order that is possible.

The Signs which shew us that there is some Pus, or Blood stopt in the *Pleura*, are Inflammation, penetrating Pain, Heaviness, a languishing and continual Fever; a hard, thick, and deep Pulse, accompanied with shivering; difficulty of breathing, a dry Cough and Thirst; one cannot lie on the sound side, by reason the matter lieth heavy on the *Pleura*; and one grows lean and thin in a few days.

*Signs of Pus, or Blood in the Pleura.*

But if the Impostume break, and the matter falls on the *Diaphragma*, all these Symptoms cease, and the Patient finds some ease for a time; but immediately there comes others not less dangerous and insupportable; besides, the difficulty of breathing, which is common to every *Empiema*, one feels a heaviness upon the *Diaphragma*, fluctuation, a great uneasiness; the Fever increases, and becomes burning; the Pulse rises, the Pain indeed is not so sharp, it being

*Signs of the Matter on the Diaphragma.*

ing felt towards the false Ribs, one cannot lie but on the side where the matter is; for if you lie on the opposite side, one feeleth a twitching upon the *Mediaſtinum*, more cruel Pain, and a much greater heavineſs; their ſpittle is ſometimes ſtinking, and there follows very often Impoſtumes of the Liver, after theſe kind of indiſpoſitions, even as it is obſerved after great wounds of the Head.

If the *Pus* be diffuſed on both ſides, one cannot lie on either, by reaſon of the ſharp Pains one ſuffers; to be eaſed, you muſt lie upon the back or belly.

*Signs of  
Pus in the  
ſubſtance  
of the  
Lungs.*

The Signs when there is *Pus* in the ſubſtance of the Lungs, may be divided into equivocal and convincing; the equivocal belong to other Diſeaſes of the Lungs; it's very dangerous to be miſtaking, therefore let's endeavour to examine them well, that we may draw ſome advantages, and that we may not undertake an Operation whole effect would prove not only uſeleſs, but fatal.

If there be any *Pus* in the ſubſtance of the Lungs, the diſeaſed cannot breathe without pain; he finds an in-  
ſup-

supportable and troublesome heaviness upon the *Diaphragma*, - because the weight of the matter deprives it of the liberty of moving. He suffers a fixed and dull pain, which is a common sign of a PLURISY, with this difference, that the Pluretic Pain is pungent, comes all of a sudden, whereas the Pneumonic Pain, ( that is to say, that which proceeds from an Impostume of the Lungs ) comes only by little and little, and successively. The continued Fever doth not leave, accompanied sometimes with an immoderate thirst; his spittle is purulent, his mouth and throat dry; he hath red cherry cheeks, sunk and hollow eyes, having lost their lively and glittering colour; his nails bend backward, and the whole body grows at last dry and emaciated; and if the Fever increase, the Patient falls into *Delirium*, and his Spittle be black, livid, or ash-colour'd, Death is not far off, because they are mortal Symptoms, which oftentimes accompany it: So much for the Impostumation of the Lungs, which comes from an internal Cause.

Let's

Let's now examine those that follow the Impostume of the Lungs caused by Wounds ; the difficulty of Breathing is not so considerable ; the Fever is continual, accompanied with shivering, and cold Sweats, which appear from time to time ; these two last accidents are depending from the *Pleura*. The Patient spits pretty often Blood in the beginning, and towards the end it's frothy and purulent. When the Spittle is of a yellow colour, it's mortal ; he cannot lie but on his back, because being on his sound side, the wounded Loab lieth heavy upon the *Mediaſtinum*, and causeth a twitching and cruel pain ; and when he turns himself on the wounded side, the Lungs coming to lie heavy upon the *Pleura* which is hurt, doth not fail to excite the same pain, wherefore he dares not stir. In the beginning his eyes are brisk, but at last they grow dull, and the face puffs up ; but the most certain Signs that the Wounds reach to the capacity of the breast, and of the Lungs being hurt are the Probe, the noise which the Air makes in coming forth, and the *Emphysema*.

*Signs of  
the Lungs  
being  
wounded.*

When

When you probe, you must observe to make the Patient put himself in the same posture he was in when wounded, that the extravasated blood may run easier out.

If the Wound penetrate to the substance of the Lungs, the Blood which flows is frothy, and the Air makes less noise, and comes not out with such impetuosity, as when the Wound penetrates only the Breast, without touching the Lungs.

If one asks, Whence cometh the Air that is in the capacity of the Breast, the Lungs not being alter'd, and the reason why it makes such a noise ? *Objection.*

You may answer, That it's the outward Air which is got in through the mouth of the Wound, and endeavouring to escape, because of the expansion of the Lungs, which press it every where. It hapneth that those Particles which appear at the passage, not being able to get out but with a great deal of pain, through the resistance of the external Air, and the smalness of the Aperture, push and press one another so hard, that they must needs make a noise, and produce a kind of whist- *Answer.*

whistling, (passing out of the breast) which can put out a Candle held to the mouth of the Wound.

*Cause of  
the Em-  
phisema.*

The *Emphisema* is likewise only caused by the particles of the Air, which penetrate the Porosities of the neighbouring parts, which swells and blows them up; so that often one cannot find the mouth of the Wound, nor introduce a Probe.

It's easy to see from what we have said, that the *Emphisema* and the Air's coming out of the breast, are not always convincing signs of the Lungs being hurt, because they happen when the Wound penetrates into the breast, without having touched the lungs; wherefore there are only the signs (which we have spoken of) that can give us afterwards certain marks of it; but the Probe, and the exit of the Air, are two true signs that the Wound penetrateth into the breast.

*Cauti.m.*

You must observe, that if the breast be pierced through and through, you must never let both the orifices be open at once, for fear you choke the Patient; the reason of it is evident, because the Air cannot enter by two opposite

opposite sides without compressing the Lungs, and hinder the motion of the Breast.

I have said, that the true situation, when the Lungs are alter'd, is to lay one down on the back for to ease the Patient, because the *Bronchia* are compressed by the weight of the extravasated blood, which presently takes away the liberty of breathing.

I intend to speak here of the superficial Wounds of the Lungs; for if they be deep, and that any great Vessel be divided, one feels almost as much pain lying on the back, as on the sides.

But one of the most certain Signs that there is some Blood extravasated into the body of the Lungs, and of which we have not yet spoken, is, that if we put our Finger far enough into the Wound, (provided the bigness or Diameter of the breast permit it) we find that the Lungs are fastned to the *Pleura* round about the Wound, and reunite themselves there, even as the Intestine is united to the *Peritoneum*.

*A certain Sign of extravasated Blood in the body of the Lungs.*

*A Sign  
that the  
Wound has  
not passed  
the Pleura.*

The Signs which demonstrate that the Wound doth not pass the *Pleura*, are the Probe, and the Air, which never passeth through the Wound: There are some others, as the Pain, Inflammation, Fever, Heaviness, and Difficulty of Breathing; besides the thickness of the exterior parts, which may in some manner guide us for to be sure of it.

All these Signs nevertheless do not always shew that the Wounds are deep, since a simple Inflammation of the Intercoastal Muscles hinder free Respiration. If we consider that the use of these Muscles is to raise the Ribs, to enlarge and widen the Cavity of the Breast, and that Inflammation and Tension are utterly contrary to their Action; we shall agree, that the Lungs cannot dilate themselves but with difficulty; and seeing the Contraction of an inflamed Muscle encreaseth the Tension, and great Tension many Divulsions, and many Divulsions vehement Pain, you must not wonder if the Diseased (for to ease himself a little from the Pain) retard the course of the spirits, and have very great difficulty of Breathing.

The

## Chap.22. Of the Empiema.

151

The Heaviness proceeds from the Impotency of the Muscles; for as soon as a part is out of action, it seems heavy to us, for it's a burthen which the neighbouring parts must support; and being they have neither strength nor motion to raise what offends, they must succumb under the weight of a new and superfluous matter, from whence depends the Heaviness.

*Cause of  
the Heaviness.*

We have explain'd in several places of this Treatise the cause of Pain, Inflammation, and Fever; we have said that the Pain is excited by some actual Divulsions, by whose occasion the Soul perceiving the destruction of a part, is afflicted, the Inflammation hapneth when the course of blood is hindred in any part, and that it's sufficient to produce the Fever, (which is a Consequence of the Pain and Inflammation) if a drop of extravasated and corrupted blood be carried to the heart.

One hath Red Cheeks in an Impostume of the Lungs; this comes from the irregular motion which the purulent Particles communicate to the Principles of the Blood, and from the great number of Blood Vessels which irrigate the Cheeks.

*Cause of  
Red Cheeks.*

*Cause of  
the Dulness  
of the  
Eyes.*

*In all Dis-  
eases of the  
Lungs, the  
Caule and  
Mesente-  
rium al-  
ways cor-  
rupted.*

*What  
gives the  
Red Colour  
to the  
Blood.*

*Cause of  
the Nails  
bending  
back.*

The Eyes lose their vivacity, and sink into the head, because the blood loseth its consistence and colour; in losing its oil and unctuousity, which makes the Eyes sink, and become insensibly wan and dull, proportionable as the sharp and tartarous Salts dissipate the oily and sulphureous Particles. This, I say, is so true, that in all Diseases of the Lungs, we always find the *Epiploon* and *Mesenterium* (which are the two *Reservatoriums* of the Fat) corrupted; it's for the same reason that all parts of the body dry up and grow lean.

You must also observe, that the Red Colour of the Blood doth not only depend on the mixture of the Sulphurs, but also on the action of the Air which whirl about its Particles; and being the Air that gets into the impostumated Lungs changes its nature, it's no more capable of setting them in motion, neither to excite so lively a Sensation as before.

The Nails bend backward, because their Extremity being irrigated with a serous Liquor deprived of Spirits, the *Cutis* must of necessity fall away and dry up; now as the Nails are only

only a production of it, it pulls them along, and constrains them to bend like as a slice of Bread held to the Fire.

You must look upon all these signs as certain tokens that the Wound penetrates into the breast; you may stay some days to examine its progress; for if they proceed from a not penetrating Wound, in a few days they cease by bleeding and suppuration; and they continue and increase when the Lungs are alter'd, or when the *Diaphragma* is oppress'd by the weight of some extravasated matter.

The *Empiema* is not always a sign that the Wound penetrates, because it may happen not only to Wounds of the breast, but also to all other parts: We see it even to come on Wounds of the Head, where we cannot suppose the Lungs to send any Air; so that unless the oppression be very great, you must not try the Operation.

An Em.  
phiema  
may happen  
to any  
parts of  
the Body.

These signs do not only lead us to the knowledge of the nature of the *Empiema*, but they tell us also whether it's necessary to practise the Operation:

Where the  
Operation  
would be  
useless.

For example ; it would be useless in the *Empiema* of the Lungs, by reason the opening of the breast contributes nothing at all to the evacuation of the matter, unless the Impostume be on the *superficies* of the Lungs , then it would be of more use, because we know that the Lungs are fastned to the *Pleura*, and the Impostume is precisely where one feels a fixed pain ; but if so be the Impostume should be deep, and manifest it self in that place by a fixed pain, it would be fruitless. If the effusion of the blood should happen from a Wound, and that by good luck the Wound were in a place where the extravasated blood could easily get out, ( provided the Lungs were not adherent ) by enlarging the mouth of the Wound to make way for it, or by laying the Patient in a posture convenient for the running out of the matter, the Operation would be useless. Finally, let the Wound be of what manner soever, if we can facilitate the evacuation of the *Pus*, by making the Aperture bigger, we ought to avoid the Operation ; but if the Matter cannot have its free course, you must

must make use of it, for to deliver the Patient from suffocation, and the chiefest circumstance of the Operation is, to chuse a proper place to facilitate the exit of the matter.

There are two places in the breast proper to make the Operation, one of Necessity, the other of Election; of Necessity, where the matter appears, as in the Impostumation of the *Pleura*, or in that of the *superficies* of the Lungs adhering to the *Pleura*, because we are forc'd to make the Operation where the Impostume is: that of Election, when there is nothing that obliges us to make it rather in one place than another, in this case you must chuse the most convenient place, which is between the second and third of the true Ribs, reckoning from below upwards four fingers from the inferior Angle of the *scapula*, and as much from the spine.

*The most proper places to perform the Operation. Of Necessity.*

*Of Election.*

You must observe, that in those who have been troubled with any long Disease of the Breast, as with a long Pleurisy, &c. the Diaphragme is insensibly fastned to the Ribs, and reaches sometimes even to the third, fourth, or

*A Caution  
to be ob-  
served.*

fifth Rib, particularly when the breathing is frequent and forc'd ; therefore you must inform your self which is the place where the diseased feels the pain ; if it be about the second of the true Ribs, where ordinarily the *Diaphragma* is fastned ; or if it be higher ; which must be well examined before you make the Operation.

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C H A P.

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## C H A P. XXIII.

*Of the Operation of the Empiema.*

**H**AVING prepared all that must precede such a necessary OPERATION, you place the diseased on a Chair or Bed ; he must keep his Body very strait, and be held up by Servants, that the Chirurgion may the easier take notice of the place where he's to make the Incision. In fat People you make it somewhat large, that you may not be mistaken.

You pinch up the Teguments for to cut them at length, (with a Bistoury) and the *fibres* of the great *Musculus Dorsalis* cross ; for if they were cut otherwise, they would stop the Aperture of the *Pleura*, and so hinder the running out of the Matter ; you continue to incise dextrously the Inter-costal Muscles : some incise them at the uppermost part of the Rib, to avoid the Vessels that lie all along its internal lower *Sinus* ; but seeing the Wounds, which are near the Bones, degenerate often into Fistula's, it's

*How to perform the Operation.*

*Caution,*

more proper to make it in the middle of the Intercoſtal Muſcles.

When you are come to the *Pleura*, you put your finger there, all along which you ſlip a Biſtory for to Inciſe the *Pleura*, minding to guide well the point of the Inſtrument with the finger, and penetrate not too deep, leſt you offend the Lungs or *Diaphragma*, which are often faſtned to the *Pleura*; the Aperture being made, you put your finger into the Cavity of the Breſt, as well to make the Inciſion bigger, as to push back the Lungs and *Diaphragma*, and to looſe them, if they are faſtned to the *Pleura*, particularly where the Operation is made in a place of election, different to that which is practiſed in a place of neceſſity, without breaking the Adherences, as we have obſerved in the foregoing Chapter.

If the Lungs ſtrive to come out at the oriſce of the Wound, you muſt push them back with a blunt hollow Probe, (for to help the running out of the Matter) or with a Pipe of a thickneſs and length proportionable to the deepneſs of the Wound. Theſe long Pipes are very uſeful in the *Emphifema*.

*phifema*, because the Aperture of the Wound being little and deep, it's very difficult, without their help, to give Issue to the Matter.

You must not make use of a Probe, *Caution.* to try whether the *Pleura* be pierced; for in passing, it often separates from the Ribs, and there is a *Vacuum* made where some Blood is apt to gather, which produces a new Impostume.

If it be Blood that comes out of the Aperture, you may draw a sufficient quantity of it; but if it be *Pus*, less, by reason it contains more spirits, and the Patient is apt to fall into a *Syncope*. After this, you stop the Wound with a blunt Tent of Lint, having a large head, and being a little crooked at the end, lest it offend the Lungs. Most commonly we tie a Thread to it, fill the rest of the Wound with little Dossels of dry Lint, to keep the Tent in, and absorb the Blood, and lay a Plaister on it, with Compress and Napkin about the Body, with the Scapular, which is cut in two at one end, and put cross, to fasten the Napkin the easier. When the Patient is dressed, you make him keep his Bed with his Head high, as if it were

*More Blood to be drawn at a time than Matter.*

were half sitting; and you let him rest, till he finds himself oppressed with the weight of a new Matter; then take the Dressings off, and having made the Matter run out, you push the Lungs back with a long Pipe, by whose means you facilitate the flowing of the Matter that remains in the Breast; you continue to dress it so every day.

We observe often, that the first three or four days Blood comes out, the next days Water, and afterwards Pus, that groweth thick by little and little.

We have observed already, that in case the *Empiema* should afford much Matter, or Water mixed with Pus, you must not evacuate it all at once, lest the Patient should fall in some weakness.

*The Air to  
be corrected  
when you  
dress the  
Patient,*

You must always correct the *Intemperies* of the Air with fire when you dress the Patient, and hinder it from entering too abundantly into the Breast, because it thickens and coagulates the matter which is extravasated there, hinders it from flowing, and causes it to come forth in Clods. If it be Blood, the Serocity separates from it, as after  
let-

letting Blood ; nevertheless, whether the *Pus* or Blood be thick, or mixt with some Water, you always use (with Prudence) Injections of Barley Water, and *Mel Rosar.* with which you cleanse the Lungs and Breast ; you must always cause the injected Liquor to come out by the help of the finger, or hollow Probe ; and if the Lungs should stick, you must loose them.

If in time the Blood should grow too watry, and the Patient be oppressed by the quantity of the *Pus*, you would do well to dress him three or four times a day.

The Matter runs sometimes for the space of three or four months, and as soon as there comes nothing out but what comes from the Wound, you procure the generation of flesh, and cicatrize.

You must observe, that when the Air works upon the Blood that is in the Breast, it coagulates it sometimes, without changing it into *Pus* ; and so it comes out in Lumps.

You must not use Injections in the beginning, neither make them with Aloes, or other bitter things, because when the Lungs are open, the Patient casts

*Bitter things not to be used in Injections.*

casts them out through the mouth ; but after the Vessels are consolidated, you may use the tincture of Aloes , or Wine mixt with a traumatic Decoction, and *Mel Rosarum* ; this is used when the *Pus* comes out in a small quantity.

Often after a wound of a Sword, there comes out of it an abundance of blood, and after three or four days no more appears ; in this occasion you must quickly close the Wound , and you have all the reason to believe, that there were only some little Vessels broke, which gave some blood , and which afterwards were stopt by the most glutinous particles of the blood ; of the rest ( however the thing happens ) there remains no danger.

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## C H A P. XXIV. Of the C A N C E R.

**I** Look upon a *CANCER* as the most inflamed and rebellious of all the schirrous Tumours; the red part of the Blood as well as the white contributing to its formation.

When *CANCERS* happen in glandulous parts, there is great appearance that the *Lympha* is the principal cause there; if they attack any other part, it's to be presumed that the Tartarous Particles of the Blood have the greatest share therein. However it be, I say that the concurrence of these two Humours is always necessary for the production of a *Cancer*; all the difficulty is, well to distinguish which of those two predominate. *Principal Causes.*

I say a *Cancer* is a round, hard, unequal, livid, and painful Tumour, caused by the meeting of abundance of Acids, and of the Tartarous Particles of the Blood, from which proceeds the pain and tention of the Vessels, which very well represent the Claws of a Crab. *What a Cancer is.*

Those

Cancers  
of the  
Glandulous  
Parts most  
painful.

Those *CANCERS* which possess the Glandulous Parts, are much more painful than the others, through the abundance of Nerves which enter into their Composition; and if the alteration of the *Lympha* contribute any thing to their generation, it's because the Glands are its principal Reservoirs.

Cause of  
the Round-  
ness.

The Roundness of the Tumour, cometh from the Round Figure of the Glands, because the Humours which cause the Obstruction, and extend the Vessels, can easily tumify these Glandulous Bodies, without changing their Conformation.

Cause of  
the Ten-  
sion, &c.

As for the Tension, and fulness of the Vessels, it's known that the Matter which they contain, is nothing else than the Matter which forms the Tumour. This Humour is Tartarous, fixt, and gross, and consequently not very capable of Fermentation; the slow progress the Tumour makes in the beginning, is a convincing Proof of it.

The *Lympha* being acid, it may well excite some little Fermentation with a porous and terrestrial Salt, which the red part of the Blood furnishes; but it serves

serves rather to fix and concenter the Humours yet more than they were before.

If this Fermentation were capable of causing the fulness and tention of these little Vessels, it would be doubtless too slow and weak to break them so soon; the Matter lieth long there quiet, till having been exalted by the Application of some Medicines, it gnaws the Vessels and Vesicles which contain it, then, I say, the *Cancer* ulcerates.

*How the  
Cancer  
ulcerates.*

The Vessels which are puffed up in a *Cancer*, are so little and tender, that one cannot distinguish them in their natural state, nor take them for what they are, if one did not see them fill'd and extended; the Humour that is within these Channels and Vesicles, not being presently able to ferment enough to break them, as I have already proved, it's at least sufficient to extend and make them appear.

You must not think that the extremities of the Vessels are open for the most attenuated and subtilest Particles of the Matter to escape; I do not believe that in the *Cancer* there's found any

any Matter in the *Interstices* of the Vessels, till the Vessicles beginning to break, that the most active and exalted part of this Humour may run out: I say, that as soon as some Particles are diffused, being they are very corrosive, it's then that the Exulceration of the *Cancer* hapneth; and as it is sometimes long without Ulceration, I maintain, that during all that time of the Tumour, the Humours are always pent up in the Vessels, different to other Tumours, whose course of Humours are very rapid, and their Fermentation very quick and violent, which causeth the Vessels to break, before one hath perceived the swelling of them.

*Differences  
of Can-  
cers.*

We observe that the Vessels of the Eyes, which in their natural state are imperceptible, grow manifest enough in *Optthalmia*. From what I have said, you may easily draw the Differences and Prognostics of *Cancers*; there are external, and internal; great, little; ulcerated, and not ulcerated, as in all other Tumours. As for their production, they must always have an acid Juice from the Lymphatic Vessels,

sels, whose Obstruction causeth the Retention of the *Lympha*, and makes acid an adust and terrestrial Matter from the Arteries and Veins.

The *Cancers* that happen to the Paps, and other glandulous parts, are the most dangerous, because it's always more difficult to remedy the disorders of the *Lympha*, than those of the Blood. Besides, these parts are very sensible, and more susceptible of ill impressions than others, which you may more successfully secure from the Symptoms which the *Cancers* may cause. *Prognostics.*

The Cure of *Cancers* (which one may well call *Opprobrium Medicinæ*) is very difficult. If some *Quacks* boast of having some infallible Remedies for them, Experience soon makes us see their Imposture. *Cancers* are very seldom cured by the use of Medicines, Chyrurgery sometimes succeeds better, but is always very dangerous: *Quibus sunt occulti Canceri* (saith *HIPPOCRATES*) *eos prestat non curare, curati namque: Citius intereunt, quam non curati*; therefore it's a great piece of Imprudence to undertake the Cure of *Cancers*. *Cure.* *Seft. 6. Ap. 38.*

of an Internal *Cancer*, unless it be small, and the extirpation of it very easy.

*Cancers exasperated, rather than cured by mild Medicines.*

Concerning the external ones, they are always difficult to conquer; the reason is, that unless we use a very great circumspection in chusing Remedies that are proper, we do not fail to irritate them; whereas the other Humours are appeased by the action of Remedies, and grow at least supportable, this seems not to receive any impression, but rather to become more furious, and to make more destruction.

*The general method of curing a Cancer.*

The general Remedies are absolutely necessary for the Cure of a *Cancer*, as a Sobre Regiment of Life, frequent and gentle Purges, Phlebotomy; the Flux of the Hemorrhoids in both Sexes, and the regular Flux of Women, give the Patient great ease.

*All sorts of Cancers to be handled alike.*

Let the *Cancer* be in what part soever, it's not treated with much diversity, unless it be ulcerated; and though it seemeth that we are more timorous to apply Remedies to those which possess the glandulous parts, than

than to others ; yet when we undertake their Cure, we make use indifferently of the same Remedies, as well for the one as the other.

Those that use sharp and corrosive Remedies, or else too active and penetrating ones, never fail to make the Disease incurable ; the softer Repercussives and Supuratives one can happily employ in other Humours, are here the most dangerous. The reason of it is most evident, to any that knows the Principles of Chymistry : The Matter of the *Cancer* is coarse, fixt, and tartarous, therefore it cannot easily ferment. If you let it alone, it requireth a considerable time for the exaltation of any of its sulphureous Salts which it contains ; but if you stir it by some fermentative and penetrating Remedies, from being fixt and immoveable as it was, it becomes very active and penetrating, because the Salt and Sulphur ( which it contains ) exalt themselves, and take the upper hand ; then doth this dead Mass, which seem'd before incapable of making any disorder, change into a Vitreolic

*What sort of Medicines not to be used.*

*The Matter which causes a Cancer, ferments not so soon as in other Tumours.*

treolic and Arsenical Matter, which gnaweth and wastes the parts which contain it, and are nigh, till at last it arrives to the most internal parts, and causeth Death soon or late, according to the diverse nature of this Matter, and the progress it makes in the parts.

*Remedies  
most pro-  
per.*

I say then, that the Cure of a *Cancer* (that is not ulcerated) must be attempted with the softest Remedies; that which cools, tempers, dissolves, repels the Humours by little and little, without exciting them to ferment; that which is capable to stop the flowing Humours, as *Aq. Solani Plantag. Fragrarie, Spermat. Ranar. Lumbricor. Sal. Saturni* Cream, New Cheese, Flesh of Veal, which we change when it's corrupted. Finally, all that mollifies and softens this Rebellious Tumour, and repels it in softning it; all this, I say, may cure *Cancers*, or at least not irritate them: And though the Reflux of the Humours could seem dangerous, yet it's the ordinary practice to go about it after this manner.

*What to be  
used in an  
ulcerated  
Cancer.*

When the *Cancer* is once ulcerated, the Remedies which we must use, are those which can hinder its progress, and

and ravage; nothing stops it more surely, than Alkalifaporous Salts, mixt with some Astringents: these fortify the part with their styptic virtue, and the other blunt, and absorb the points of the Vitreolic and Corrosive Salts, that causes all this disorder. All Authors recommend this practice, and if it hath not altogether an advantageous success, you must have recourse to the Extirpation of it, seeing neither Resolution nor Supuration is to be hoped for.

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## C H A P. XXV.

*Of the Extirpation of the*  
CANCER.

*Three ways  
of extirpa-  
ting a  
Cancer.*

(1)

*By Incision.*

THE Cure of a *Cancer* may be attempted by Incision, by Ligature, or by Actual Cautery. If you undertake it by Incision, you must cut its most deepest Roots; that is to say, you must anticipate upon the neighbouring parts, and having taken it off, you must squeeze the adjacent Vessels to make the Blood and Humours come out, which may have contracted malignancy.

(2)

*By Liga-  
ture.*

In respect of the Ligature, it's not much in use; but if you would put it in practice, it must be when the Bases of the Tumour is but small, when the Roots extend themselves not far in compass, and when it terminates in a kind of strangulation; but being it is rare (not to say impossible) to meet with such a disposition, the Ligature has no other use than that of suspending the Tumour, that you may make the Incision more commodious.

You

You must observe, that if you apply slightly the Actual Cautery after the Operation, it's to stop the blood, and absorb and destroy some portion of the unclean matter, which could serve as a Ferment for the Generation of a new Cancer, and might even infect the whole mass of blood.

(3)  
*Actual  
Cautery.*

The method used in performing the Operation is this; you introduce into the top of the Tumour a Needle arm'd with double Thread to make a sort of Loop, with which you uphold the Tumour, and the Surgeon cuts it round about the Base 'till to the Ribs, with a very sharp Knife; having taken off the Tumour, you squeeze the blood out, and pass slightly over it an Actual Cautery, you dress the Wound with Pledgets arm'd with astringent Powders, and lay a Plaster on it with Compress, Napkin and Scapuler.

*How to per-  
form the  
Operation.*

But the best method is to make an Incision cross over the Tumour, even to the Ribs, and separate dextrously the flesh from the skin; by this means you avoid the great deformity and pain, and secure better the Wound from the Air.

*The best  
way of ex-  
tirpating a  
Cancer.*

*the Cancer.* Chap. 25.

If the Diseased be not in a disposition proper to endure the Operation, either through fear of pain, or being weak, and the Surgeon not make a favourable Prognostic, it would be a rashness to undertake it; besides, that the great loss of substance, and dangerous accidents which happen, are worthy of reflection, which break often the measures that the most daring Practitioners can take: for as soon as the Tumour is taken off, the Ulcer grows often malign, painful, and of a round figure, which is a mark of slow cicatrification; the sides become calous, livid, high, black, and inverted, according to the disposition of the Juices with which they are water'd.

*An extraordinary  
way to cure  
a Cancer.*

There are some ( that without performing the Operation ) do assure us, that they have cured ulcerated *Cancers* with great Red Snails freed from their shells, which are laid upon the Ulcer; they say that they creep sometimes about the Ulcer, fasten to it, and leave their foam there; that we find the bottom of their belly gnaw'd as it were, and they grow so monstrous, that in a short time they burst.

The

The reason is, that these Animals contain an abundance of Volatil Alkalys, which charge themselves with the Acids that entertain the *Cancer*, and which grow and ulcerate the belly of these Animals; so that being convey'd through the little branches of their veins, into their mass of blood, according to the order of Circulation, they excite such an extraordinary Fermentation, that these Animals must needs perish.

## CHAP. XXVI.

## Of Bronchotomia.

Broncho-  
tomia, a  
nice Opera-  
tion.

**T** Here is no Operation in Chyrurgy of a more nice undertaking than the *Bronchotomia*; neither is there any more pressing or useful, when ever one has the happiness to succeed in it.

Causes.

The Causes of this troublesome Affect, proceeds ordinarily from some Wound, great Crying, long Discourses, violent Passions, or the alteration of the Humours.

If a simple Inflammation be capable of hindring Respiration, what will not happen if any of these Causes concur to increase it? Now whether the Inflammation attack the Muscles of the *Larynx*, or some other parts, it communicates it self not only to the *Aspera Arteria*, but also to the Muscles of the *Pharinx*, and neighbouring Glands, which obliges the blood and spirits to stop in all these parts, and to cause  
great

great obstructions, then doth the blood ( which without intermission pressing on ) not finding its passage free, stay there, and augment both Inflammation and Tention; the Vessels being after this manner distended, and swoll'n up, take up more space than before, and must needs press the *Aspera Arteria*, and hinder the passage of the Air in that part, whence follows Suffocation.

Bleeding, Clysters, Resolutive Cataplasms, Gargariems made with strong Wine, in which you boil ( in *B. Maria* ) Sanicle, Golden Rod, Perivinkle, and Angelico; with many other Remedies, are to precede the Operation, unless danger of Suffocation oblige us to make it.

If the Obstruction and Inflammation attack only the Amigdals, or *Glandula Tyroides*, you must endeavour to open them by the mouth with the point of a Lancet arm'd with a band of Lint. If all parts of the Throat be inflamed, and all Remedies proved without success, you must betake your self to the Operation.

How to  
perform the  
Operation.

To do it methodically, the Patient must sit upon a Bed or Chair, with his head back, leaning on a Servant's breast, who upholds it with his hands.

Being in this posture, the Surgeon chuses the most convenient and less dangerous place, where he may make the Operation, which is a Thumb's breadth from the *Larynx*, between the third and fourth Ring of the *Aspera Arteria*, he pinches the *Cutis*, &c. cross: makes an Incision at length, and separates very gently and artificially, the *Broncholes*, and *Musculi Sternohyoidei*.

Caution.

Having discover'd the *Aspera Arteria*, you incise cross-ways ( with a Lancet arm'd ) the Carnous Membranes which ties the cartilaginous Rings together, avoiding the recurrent Nerves, which carry the spirits necessary for the function of the organ of the voice, which ( if they should chance to be cut ) would be lost.

The Incision being made, before you withdraw the Lancet, introduce a Probe, which facilitates the entry of a short Pipe, which must be crooked, and

and proportionable to the Wound ; there must be a hole on each side to pass a little Ribon through, which is to be ried behind the Neck to keep it fast ; we put a little Cotton, or piece of Sponge at its entry, for to modify the Air a little, then apply a Plaister on it with holes in it, Compress, and a pierced Bandage.

## CHAP. XXVII.

## Of Fistula Lachrimalis.

Cause.

**T**He *Fistula Lachrimalis* is always caused by a sharp and salt Humor. If the Matter of the Tears, which run through the lachrimal passages, have received any alteration, it may cause some obstructions in those passages, which terminate at the *Aperture* of the *os lachrimale*, without communicating its alteration to the neighbouring parts. I will not call this indisposition a *Fistula*, but Obstruction, which nevertheless permits the serosity to escape involuntary; which must be well distinguished, because the operation is not necessary if the lachrimal Bone be no way alter'd; for the Operation consists in nothing else but to pierce the Bone, and consume the Cariosity. We use in this occasion general Remedies, and all Coliriums proper to deobstruct and disinflame these parts.

*When the  
Operation  
is not neces-  
sary.*

If the Matter which causes the obstruction excoriate, and slightly ulcerate the nigh parts, one may call it  
a false

a false *Fistula*, which yields to attenuating Medicines, and those which are proper to consume the Calosity that comes upon it.

But if the serosity by its acidity excoriate the little Tubercle of Flesh, which the Ancients took for the lachrimal Gland, and the other nigh parts; there comes upon it an Ulcer, which soon degenerates into a *Fistula*, by the action of the most pungent and acid Particles; as I have proved at length in the examination of the *Fistula in Anc.* So that this impure serosity, being capable of Corruption, rots the Bone by its lying there, and stops the passage of the Tears. I will call this the true *Fistula*, where the operation is of great importance.

*What a true Fistula Lachrimalis is.*

It happeneth often that the same Humor which waters the Eye, runs to the lachrimal *Sac* without producing its effect: The reason is, because it beginneth only to enter into its first degree of Corruption. But this *Sac* being a production of the interior Membrain of the Nose, which is extremely spongy and penetrable; the Humor has strength enough to penetrate it, and so cause an inflammation

which stops the passage of the Tears, which by lying there wax sour, and afterwards grow so sharp, that they cause a *Fistulous Ulcer*, or a kind of *Fistula* which one might call complete, to distinguish it from the others.

The Matter of the Tears is not always the cause of this *Fistula*, as it is the effect of it: It's very often the consequence of some Imposthume, or even of the inflammation of the lachrimal *Sac*, without this pretended serosity contributing any way towards it: It may truly by lying still there, thicken and harden by heat, or it may degenerate, mixing with some other strange Humor, and so contribute to its Formation.

You must observe, That in this last kind of *Fistula*, there is always some *Pus* in the lachrimal *Sac*; the most of them that are troubled with it, press every day the side of their Nostrils, to squeeze out the Matter, so they may avoid the pain of the operation, being rather content to have it as long as they live.

## CHAP. XXVIII.

*Of the Operation of the Fistula Lachrimalis.*

**W**E have already said, that the operation of the *Fistula Lachrimalis* consists in piercing the Bone, and making the Matter which entertains it flow more easy, and in deobstructing the passages. *How to perform the Operation.*

For this you introduce the Probe to know whether the Bone be discovered or carnous; but particularly whether its hole be stop'd.

If the exterior Orifice of the *Fistula* *Caution.* permit not the entry of the Probe, you must dilate it with a little prepared Sponge, or make an incision with the Bistoury, taking care not to cut the little Bridle, which makes the reunion of the two Eye-lids; which is nothing else but the Tendon of the Orbicular Muscle, that performs the office of a Ligament: for if by chance it should be cut, the lower Eye-lid would be revers'd, which is an indisp<sup>o</sup>sition

position much more troublesome and deform'd than the first.

When you have made the Incision, you fill the wound with dry Lint to obsoorb the Blood, and dilate the lips to see more easily the bottom of it. The Bone being laid bare, you introduce a little *Canula* into the hole of the *Os Lachrimale*, and with actual Cauteries of different Figures you pierce the Bone, which is very thin; lightly passing the Cauteries over its surface to hasten Exfoliation, and destroy the Cariosity, if any. After that you procure the suppuration of the wound, and lay in the bottom of the *Fistula* Medicines proper to procure Exfoliation of the Bone.

*What to be  
done to pre-  
vent Infla-  
mation.*

You must observe, That before you make the Operation, it's necessary to apply on the Eyes some defensative made with *Aq; Plantag. Rosar. Album. ovi, Ol. Rosar. & tuiæ*, you continue to use it until there is no more fear of Inflammation.

When the Operation is finished, you order the Patient to lie on his Back, that the Matter of the Tears may take its course through the Aperture that hath

hath been made; you must have regard to two Circumstances. The first, to stay till the rottenness be destroy'd before you procure the generation of Flesh. The second, to hinder the cicatrize from rising too high, which would be a very disagreeable deformity. Finally, you apply a Plaister, Compress, and a Handkerchief a-cross, or the lachrimal Band.

## C H A P. XXIX.

*Of the Polypus.*

**F**OR to have an Idea of the generation of the *Polypus*, you are only to call to mind what we have advanced, when we spoke of a *Sarcoma*; and to make, at the same time, some reflection upon the structure of the part; viz. upon the nature of the inferor Membrain of the Nose, which is very thick, spongy, penetrable, actually watered, and imbued with a viscus glewy Humor; which are all the requisite and necessary Circumstances for to make us think, that it contributes much to the formation of the *Polypus*, by reason its Porosities are so disposed, that they let pass nothing but the most crass and fungous Particle of the Blood, which are very fit to produce some Excrecence.

To

To explain rightly this generation, *True cause of its generation.* we must only admit a little more heat and intemperies in the Blood. The intemperies encreases the motion, and exaltation of those viscous Particles, and the heat fixes and condenses them, by dissipating their humidity. Wherefore its not to be wondered at, if there abundance and profusion towards a spongy part, furnishes the Matter of a *Polypus*.

This Humor (I say) tho agitated, stops in the contexture of this Membrain, it extends the Vessels, blows up the Glands, dilates the excreffory Channels, and obliges all these parts to rise in a Tumor, as well by its thick consistency, as too great intemperies; which makes it be no more in a condition to pass through the Porosities of the Vessels that contain it, and so it congeals; and by a strange heat changes into a fungous and carcinomatous Substance: So that by the addition and presence of a new matter, the *Polypus* grows insensible until it be intirely informed.

Of *Polypus's*, some are schirrous, *Difference of Polypus's.* and some painful.

There

There are some which change into a cancerous Ulcer, and are most ordinarily the consequences of some neglected venereal Distemper, whose leaven retires, and nestles in diverse corners of the body, where it lieth a considerable time, without manifesting it self, or producing its effect.

Some of them are white, soft, and some red; the latter are the less adherent, and easiest cured. The operation is never practised in the painful, nor schirrous. The painful are of difficult cure; the schirrous endure best the action of caustic Medicines. Those that ulcerate, and become cancerous, are sometimes conquered with such Remedies as are employ'd in the Pox. The cure of the soft, white, and red, particularly when they have a body, and are considerably grown, is easily brought to perfection by the Operation, or by Catheretic Medicines.

*How to  
perform the  
Operation.*

The Operation consists in pinching the *Polypus* by the Roots, with a particular pair of Forceps, which we turn from one side to another; and pulling by little and little, we tear off the *Polypus* with its roots. When you have extracted

tracted it, the Patient snuffs up some Wine into his Nose ; if a flux of Blood follow, you blow up some astringent Powders to absorb the Blood, and dry up the Ulcer. They are sometimes so considerable, that they occupy partly the narrow of the Throat, and so hinder the respiration and deglutition. In this occasion we endeavour to extract it through the Mouth with crooked Forceps.

## C H A P. XXX.

*Of the Cataract.*

*Several opinions concerning the cause of a Cataract.*

Those that have treated of the *Cataract*, are divided in their Opinions concerning the cause that produces it. The one have maintain'd, That its only an obstruction of the apple of the Eye, form'd by the most viscous part of the watery Humor, which is shut up between the *Cronea* and *Uvea*. Others thinking to hit better, have advanced, That it's a Web which is form'd before the chrestaline Humor. However, I conceive, the *Cataract* to be formed after this manner.

*The Author's opinion concerning the causes of a Cataract.*

All the World agree, That all the parts are form'd from the first moment of Conformation; and we can demonstrate by these incontestable Principles, that there's never a Cist or Membrane generated absolutely against Nature; and that these Cists and *Cataracts* which come so frequently, or to say better, which appear and become sensible to our eyes, are nothing else than

than the unfolding of the Membranes, and the little Pellicles which compose the parts ; from which I conclude, that the *Cataract* begins only to be form'd by a little Pellicle which separates its self from the Chrystalline, and swims in the Aqueous Humor, which carries it from one place to another, according to the various motions we give to the eye.

Which we may without pain conceive, if we consider that this Humor is nothing but a composition of several little Pellicles one laid upon another, and which may easily be taken asunder after it's boil'd ; so that if we couch the *Cataract* when it's quite framed, you change, in a manner, the figure of the Chrystalline, that is to say, of convex it's made flat.

Now this Humor being no more so convex as it should be, there must a weak refraction follow from it, and consequently some confusion ; I say, that the beams which come from every visible point of an object, and which enter into the eye at a certain distance, are never soon enough broken, by reason of the flatness of the Chrystalline, to be united when they come to the

*The composition of the chrystalline Humor.*

*An inconvenience which always follows upon the couching a Cataract.*

*Retina,*

*Retina*, which causes us to see the object confusedly. We help this inconvenience by the means of a convex Glass, which regulates the distances that's necessary to make the refraction more favourable; and that the *Retina* may stand just at the reunion of the beams, which paint in Minature (upon this Coat) the Image of the object: From whence it follows, That those whose *Cataracts* have been couched, never perceive objects so distinctly as others.

When first they begin to be form'd, and keep as yet their transparency, one sees the object, as if it were through a Cloud; and then we call them *Sufusions*. This little Pellicle changes colour and consistence, and cometh to be more or less thick, according to the nature of the Juice with which it's water'd, and the mixture of the Humors which renders it opake and impenetrable to the light; this makes all the differences of *Cataracts*; there are some white, some of a lead colour, some green, yellow, pearl-colour'd; others of the colour of Sea-water, or of burnished Iron.

*Different  
colours of  
Cataracts.*

Some

Some are Lactaceous, as the white ones ; some are more hardned, thinner, drier, and consequently more capable to bear the Needle, as those like Pearl, or burnished Iron ; on the contrary the black, green, and yellow, are thick, extremely adherent, and very difficult to couch.

*Other differences of Cataracts.*

There are others which are hard like Parchment, and which have a sort of elastic virtue, which is the cause why after they are couched, they rise presently again ; the lactaceous or milky cannot resist the Needle, by reason of their little consistence and fluidity.

You may know, when the *Cataracts* are in a condition to be couched, when in dilating the *Pupilla*, by rubbing the Eye, they remain fixt without any motion.

*To know when a Cataract's ripe.*

If the beams of a Candle that pass through a Bottle full of Water, or a Chrystal, make the Patient perceive some Colours, it's a sign the *Cataract* is not quite form'd.

I do not speak here of the cause of the alteration in the Christalline, and of the different changes of the *Cataracts* ; I should have been obliged to speak of the Nature of Colours, but  
time

time hath not given me leave ; therefore I pass to the Operation.

*How to perform the Operation.*

You place the Patient in a very light place, a Servant holds his Head behind, taking care to cover the sound Eye, that he may not turn aside ; then bid the Patient turn his Eye towards his Nose. The OPERATOR with a round or flat Needle, having a handle, pierceth the *conjunctiva* near the *Cornea* at the little angle, and he passes through it the point of the Needle. From the *Aqueous* Humor, you place it on the *Cataract*, and endeavour to couch it gently, keeping it a little while under. If the Patient distinguishes the objects, it's a sign the *Cataract* is couched ; but if it rise again, we are obliged to reiterate the Operation, and to hold it longer down with the Needle. After which you apply on the Eye a Medecine made with *Aq; Plantag. Rosar. & alb. ovi*, with a Compress and Handkerchief a-cross.

## C H A P. XXXI.

*Of Wounds of the Head.*

**W**E have made you observe in the beginning of this Treatise, that a simple Wound of the Head may be cured by the Suture, or by the uniting Bandage, unless the loss of substance be considerable. *A simple Wound of the Head may be cured by Suture, &c.*

But if the Wound be compound, that is, if besides the exterior parts, the Skull, *Dura Mater*, or the substance of the Brain it self be offended; the Physician and Chyrurgeon ought to suspend their Judgments, and recollect, at the same time, their Ideas and Knowledge, to prevent the ill Consequences of any Accident, whose causes and symptoms are so dangerous, and very often Mortal.

The Skull may be fractured, the *Dura Mater* prick'd, cut, broken, torn, depressed; and the Brain cut, taken away, shaked, or filed with some extravasated matter.

The

*The Skull  
may be hurt  
2 ways.  
5 Kinds of  
Hippocra-  
tes.*

The Skull may be hurt two ways, by Incision or Contusion. *Hippocrates* has established five kinds of Fractures; which he hath called Fissure, Contusion, Incision, Depression, and Counter-Fissure.

1. *Fissure.*

Whether the Fissure be Oblique or Perpendicular; it contains one only difference, which is to distinguish well whether there be but one, or both Tables fractured.

2. *Contu-  
sion.*

The Contusion is of two sorts; the one doth not destroy the Continuity. *Hippocrates* called it *Thlasís*, vel *Phlasís*; it's nothing else but the forcing down of the Bone, without being broke.

*Most inci-  
dent to  
Children.*

According to *Hippocrates*, it happens on the Skulls of Children, that have as yet the Bone very soft and tender. This Depression is after the same manner, as a bruise in a Pewter Pot.

The other kind of Contusion destroys the Continuity. In this the Bones are equal and contiguous. It's a single Fissure which always reaches beyond the place where the blow was given. If it be apparent, it's called *Rhizma*: If it be insensible, it's called *Trikismos*, or a Capillary Fissure.

The

### Chap. 31. of the Head.

197

The Incision is of three sorts, *Eccope*, 3. *Incision*. *Diacope*, and *Apokeparnisimos*; *Eccope* is a perpendicular Incision of the bone, without carrying off the piece, leaving nothing but a mark. *HIPPOCRATES* calls it *Hedra*, the Latins *Vestigium*, or *Sedes*. *Diacope* is, when the blow lights obliquely, and goeth deep into the substance of the bone, without carrying it off: And *Apokeparnisimos* is, when the piece is intirely carried off.

The Depression destroyeth both the equality and contiguity of the bone; 4. *Depression*. *HIPPOCRATES* calls it *Espblasis*, or *Entblasis*, depression or fracture with a splint; he hath established three kinds of it, *Ecpiesma*, *Angisoma*, and *Camarosis*.

*Ecpiesma* in Greek, is a depression of the Skull, where the Splints press the *Dura Mater*. *Angisoma* is a depression where the Splint separates it self, and passeth under the sound bone. *Camarosis*, or the Vault, is the third kind; this is divided in five sorts.

In the first, a part of the Bone bends down in breaking, and the other turns up. In the second, the Bone boweth downward without any

K

flit;

slit ; this hapneth only to Children, as I have explain'd heretofore.

The third is a Depression, where the sides are forced down, the middle remains bent upwards, as a kind of Vault, leaving some hollownes under it.

The fourth riseth of it self ; this is also when the Bones are only membranous, because they have a kind of spring or elastic virtue, till they begin to ossify.

Lastly, the fifth kind of *Camarosis* is, when the second Table is depress'd, and the outward return'd to its first state ; this last only happens to Infants, for Reasons which we have alledged.

S. Counter-  
Fissure.

The *Contra Fissura* which *HIPPOCRATES* hath established without ground, hapneth in the same Bone, in divers Bones, and in different Tables ; in the same Bone, when the uppermost part is struck, and the lower broke in divers Bones, as when the blow is given on the occipital, and the coronal is broke ; in different Tables when the first is struck, and the second broke.

These

These are three Chymeric Examples quite contrary to the structure of the part; if we see wounds of the head of this nature happen after Concussions of the brain, it proceeds not from a Counterfissure, (as *HIPPOCRATES* pretends) but by true Relapses.

It may easily be seen, that when a man has lost his senses, and hath recover'd them partly again; he is yet all giddy, and may after this manner relapse twice or thrice, and get new Wounds; for it's impossible that a Machin compos'd of several pieces as the Skull is, can break in a place opposite to that where it received the impression, it being certain that the blow dieth in all the circumference of the assemblage, and that the diploe hinders the shake from being communicated to the interior Table.

*No such thing as a Counter-Fissure.*

But without confounding and mistaking our selves, we may say, that the Skull may be slit, depressed, fractured, cut, or carried off.

If it be slit, the Fissure is visible, or almost insensible; but whether it be apparent or not, nothing is capable

of giving us convincing marks that it penetrates, and that there is blood spilt on the *dura mater*, than these which succeed.

The use of Ink, the Ruginé, and the Handkerchief in the mouth keeping one's breath, is absolutely useless, because the Diploe confounds and hinders one from seeing whether it reaches to the *dura mater*, or not; besides the practice of the Ruginé will never be approved on by good Practitioners, not only because they do not give us any knowledge, but also because there remains a loss of substance, and deformity of the part.

If it be a Depression, it presses with it the *dura mater*, and causeth several Accidents, which we will examine.

If it be fractured, either the Splinters are separated from the *Cranium*, or not; so by either way the *dura mater* may be compress'd, prick'd, or torn, and the Brain hurt, or at least some Blood may be spill'd upon these parts.

In all these occasions, (I say) if the Fracture do not permit an union of the

the shatter'd Bones, and vent given to the strange bodies, which might alter the *dura mater*, you must, without more ado, perform the Operation, (provided some ill Symptoms preceded) otherwise the Patient would die.

If it be cut or carried off either with, or without shattering the Bone; as for example, If the Incision penetrate not, and there be only a part of the Bone separated, the consequences are not dangerous; but if it go deep, and there be some Splints separated that offend the *dura mater*, if we do not soon remedy it, the Patient is in danger of life.

If the *dura mater* be inflamed, either by diffused blood, or by some pricking, compression, tension, cut, or rupture, one presently feels pain and heaviness in that part, the Eyes grow puft up and inflamed, the Face red and swell'd, the diseased is drowsy with Fever, the Pulse hard with shiverings, and blood comes often from the nose, ears and mouth, just as in great concussions of the brain.

*Signs of  
inflamed  
dura ma-  
ter.*

We know that the *dura mater* is prick'd or torn, when there are some sharp pointed Splints, or rugged pieces of the bone which press it.

We are persuaded that it's compressed, &c. when the bones are depress'd and appli'd, as it were, against its surface, or that the broken pieces of bones are separated; or finally, that there is some extravasated blood which offends it.

We are convinc'd that it's cut, when it's caus'd by a sharp and cutting Instrument, and that the Fracture be of a great length; but if the bone be only crackt, and some blood be extravasated upon the *dura mater*, only those signs which I have describ'd, (and which I am going to explain) can give us certain evidences of it; I need not here repeat the explication of the pain.

Cause of  
the Heaviness.

The Heaviness proceeds from the diffused blood upon the *dura mater*; for since she is to rise and follow the motions of the Brain, if the weight give her not liberty to obey, and the Brain find any resistance, her motion must be somewhat interrupted. Now seeing

seeing the motions of the Brain depends on that of the Arteries, the Impulsion of the Blood not being sufficient to elevate the substance of the Brain, and the weight upon it, its course must be slower in this part, and a heaviness must follow thereon.

The Eyes become puffed up and inflamed; to explain this *Phænomena*, you must only remember, that the Sinus's of the Basis of the Skull are only productions of the *dura mater*, and that they receive all the residuous blood that comes from the veins, which are distributed about the globe of the Eye. This being so, it's evident, that if the *dura mater* be inflamed, she communicates it to the Sinusses, and so opposes the return of the blood, which the veins are to pour into these little reservatories; and since the arterial blood still presses forwards, the globe of the Eye, which is pressed by these two liquors, (by the reflux of one, and arrival of the other) must needs tumify and inflame.

*Cause of  
puff-up  
and inflamed Eyes.*

Not to confound the Inflammation of the Eye with that of the Eye-lids, you must consider, that that which happens to the globe of the Eye, proceeds from the Inflammation of the *dura mater*; and that of the Eye-lids, from the Inflammation of the *pericranium*; for the interior membrane of the Eye-lids is a production of it.

We observe, that Inflammation of the Eyes doth sometimes not appear till the third, fourth or fifth day; this can come from nothing else, but from the long passage which there is between the Inflammation of the Sinuſes, and the more or leſs progreſs it makes during that time.

Reasons of  
redneſs of  
the Face,  
&c.

The Face groweth red, and puffed up, by reason the Inflammation of the *dura mater* obligeth one part of the blood that mounteth to the head through the internal *Carotides*, to spread on the place where they pierce the *dura mater* even to the neighbouring parts, and external *Carotides*; which is ſo much the more true, ſince we know that all parts of the Face ſwell and grow red in a very little time after any Inflammation, being wa-  
ter'd

ter'd with a great many sanguiferous vessels; for the same reason the blood runs out of the nose, mouth and ears; and besides the blow that troubleth the whole œconomy of the brain, it's to be presumed, that the blood which flows in abundance, some little cappillary vessels may be broken, by the great distentions they endure.

The Patient is drowsy: To explain this kind of Lethargy, we must still have recourse to the Inflammation of the *dura mater*, and to the blood which is stopt in its Sinusses; or at least to the slowness of its motion, be it that the arterial blood is no more mingled with the grosser blood which they contain, or that the Inflammation increaseth. It happens that the weight of the blood which is pent up in these Sinusses, press the *corpus callosum*, and the nerves which are distributed about the organs of the senses, so by this means makes the head dull and heavy. You must observe, that this kind of Lethargy is not so deep as that which comes when the matter is diffused upon the brain, as we shall speak of in its place.

*Reason of  
Drowsiness.*

Cause of  
the Fever.

The Fever is caused by the inflammation and pain; for it's sufficient if but one drop of corrupted blood be convey'd into the whole mass to produce it.

Cause of  
hard Pulse.

The Pulse is hard: To explain this *Phænomena*, you must consider, that the *dura mater* accompanieth the thick cords of the nerves in their passage, and the inflammation and great tention which she suffers, are capable to straiten all the little membranous sheaths which invelop them, and consequently to hinder the spirits from flowing with that liberty into the *fibres* of the heart; so that its spring being weakened for want of this distribution, you must not wonder if it doth not force the blood into the Arteries with the same force and vigour as before, and if the Pulse be deep in this occasion.

Cause of  
the Shiverings.

The Shiverings which accompany the Fever, can proceed from nothing else than the purulent matter, which causes the Impostumation; and from the disposition it has to be stop't, and prick the membranes, at the time when the veins are charged with it, to carry it.

it to the heart, and from thence to all the parts ; and seeing the most part of membranes are carnous, and each muscle hath its particular membranes, which is separated into a million of membranous fillets, which spread themselves into the body of the muscle, and inchain all the little carnous *fibres* to one another, we have reason to believe that the spirits running tumultuously into the *fibres*, occasioned by the motion which was imprinted in them, exciteth shiverings, which are so many little convulsive motions.

The Brain may be hurt by a great commotion of the Head, by some blood diffused into its substance, or by some particular wound. *The Brain may be offended divers ways:*

If the Commotion be great, yet without any vessel broken, one falls to the ground with loss of the senses, feeling and motion, blood comes out of the nose, mouth and ears, the Excrements and Urine come out involuntary, with often swooning and vomiting, sometimes soon, sometimes late. *Signs of a Concussion of the Brain.*

Cause of  
falling  
down.

If one falls down, it's an evident sign that not only the spirits are in disorder, but also that the commotion hath violated the nervous fillets of the *corpus callosum*, and that it has so rudely shaken the brain it self, that the course of the animal spirits hath been suppressed. Now since the spring and tonic motion of the muscles, that hold perpendicularly our bones together, and sustain the whole machin, depend only from the influence of the spirits which pass through the nerves into our muscles, if by any misfortune these cords come to slacken, and to lose some spirits by any mishap, the machin must needs fall.

Cause of  
loss of the  
Senses.

The Senses are lost, by reason the course of the spirits is interrupted in the brain, and cannot repair to the organs of the Senses; now since the functions of the Senses depend on the course of the spirits in the nerves, it's no wonder if the exterior objects make no more impression upon our Senses, and we be no more in a condition to distinguish them. The *Phænomena* is a consequent of the precedent.

The

### Chap.31. of the Head.

209

The Blood flows out of the Nose, Mouth and Ears : To explain which Symptom, you must consider that these parts are rudely shaken in the time of the assault, that the blood and spirits are stopt in the brain, and that the great cords of the nerves, which at their passage out of the skull pass between the branches of the carotidal and vertebral Arteries, imprint there such a violent motion at the time of the concussion, that they oblige the arterial blood to turn short, and flow into the external *Carotides* ; so that these receiving almost all the blood which mount to the head, as well from the Inflammation, as from the shakings of the nerves, must needs break some capillary vessels.

*Cause of bleeding of the Nose, Mouth and Ears.*

The Excrements and Urine come forth against one's will, because the spirits repair no more in such cases to the sphincters of the *Anus* and Bladder, than to other parts, which causes them to lose their spring, and permits the issue of those Excrements; the motions of the heart are weak and languishing, only for want of these same spirits.

*The cause of involuntary shedding of Urine and Excrements.*

One

Cause of  
Vomiting.

One vomits at the very instant, or some time after: If one vomits presently, it's a sign that the Commotion has not been one of the greatest, and the course of the spirits not long interrupted, since the impulse of the blood hath broke the sluice of them, and forced them to retake their course, and launch with so much quickness into the ventricle, that they excite this first vomiting, in which one renders nothing but Aliments.

But if the spirits be long retarded, it's a sign that the shake hath been very rude, and that the figure of the Brain is vitiated, since we see that when they are at full liberty, they run with precipitation into the tunicles of the ventricles and intestines, which by their irregular and vermicular motions oblige the Bile, which runs into their cavity, to force the *Pylorus*, and pass into the stomach, from whence it's driven by the powerful contraction of its carnous fibres.

You must observe, that in this last Vomiting, where one renders Bile, it's  
much

much more violent than the first, and that the diseased lose their strength, vigor, and ordinary motion; these are the Accidents which immediately follow Concussion of the Brain.

Now it's very important to examine well those that happen when the Brain is hurt, and when any Blood or *Pus* is extravasated in its substance; sometimes it is an effect of the Concussion that hath broken some vessel, and sometimes an effect of the blow, which hath prickt or cut the *dura mater*, or which has penetrated, or carried off some portion of the Brain; or finally, it's some *Pus* between the *dura* and *pia mater*, which is shed upon the Brain. In all these Causes the Fever comes with double Fits and Shiverings, accompanied with Vomiting, Convulsion, *Delirium*, Lethargy, and Apoplexy. And besides this croud of Symptoms, the Liver and Lungs often impostumate; which is known by a fixt pain on the Breast, or in the region of the Liver, and by reiterated Shiverings.

As for the Fever, with its Intermittings which come upon it, it's not hard to give Reasons for this extraordinary Fer-

*Cause of the redoubling of the Fever.*

Fermentation, as soon as we be a little attentive upon the changes of corruption, which happen to the matter that's diffused upon the substance of the Brain.

It's not to be doubted but that it grows impure, and more or less sour, according to the time it lieth there, that the veins are from time to time charged with it, and that a part passeth into the Heart, Lungs, and all the other Organs, which by their continual motions form and grind them, as it were, into a thousand little parts, which lively hasten the impetuous course of the blood, and which cause the trouble and perturbation of the spirits, which march in disorder, which precipitate the motions of the heart, and increase the Fever ; and when ever that strange matter which is offensive to the Brain, hath got some degree of corruption, and made it self fit to circulate with the venal blood ; this matter, I say, receiving the same alterations and triturations which we have supposed sets the blood more sensibly in motion, and puts it in a much greater effervescency, on which depends  
the

the strength of the returns of the Fever. After this manner, as often as the Blood is charg'd with it, the returns ( which are as it were periodical ) are renew'd.

From all the Reasons which I have alledged, it's easy to understand, that there are few parts or corners of the body where this purulent matter is not thrown ; it pricks the Nerves, irritates the Membranes, transmits its action on the ventricle, nests its self sometimes in one muscle, sometimes in another, and causes shiverings, vomitings, and the vicissitude of irregular and convulsive motions, which shew that the mass of blood is mightily suppress'd, the course of the spirits much agitated, so that *Delirium* and Lethargy must follow.

The *Delirium* is an effect of the great inequality of the course of the blood in the redoublings of the Fever, and of the diffused matter, which begins to penetrate and corrupt the substance of the Brain ; the inequality of the course of the blood in the time of the

*Cause of  
Delirium.*

the redoublings, rules the irregularity of the course of the spirits in the parts, and the extravasated matter gnaws by its acrimony the vessels and nervous fibres of the white part, so puts to the rout the spirits into the muscles, organs of the senses, and in the passages of the brain, where the Idea's are weakned with irregularity and confusion.

*Cause of  
the Lethar-  
gy.*

The Lethargy follows, when ever there's much blood spilt upon the brain, being in its last degree of motion and exaltation, the weight of the extravasated blood presses the brain, and the quick motion of the blood causes the courser particles to separate from the fine ones, that they stick to the pores of the glands, and stop the passage of the spirits; so that the brain finding it self oppress'd with the weight of the matter, the Patient falls into a profound drowsiness; but in the time that this extravasated matter dissipates its self, the courser particles, which are so many fluxes, be put out of order, by the impulsion of new blood, the spirits fly out into the parts with

with so much vivacity and confusion, that they renew the Phrensy, which succeeds the Lethargy, just as the Lethargy succeeds the *Delirium*; you must observe that in this kind of Lethargy, the Eyes are sometimes open and troubled.

Lastly, It happens that the blood hastens with so great impetuosity to the brain, and that the extravasated matter gathereth there so abundantly, that it interrupts, by its weight, the course of the spirits, and constrain the Sinusses of the *dura mater* every where to overflow, so that the Arteries being unable to empty themselves either into the Veins or Sinusses, the brain finds it self so press'd on all sides, that the wounded falls into an Apoplexy, which makes us know that Death is not far off, and that there is no more help.

*Cause of Apoplexy.*

The Liver or Lungs impostumate in great Wounds of the Head, by the arrival of *Pus*, which comes from the Brain, of which the mass of blood hath got some impressions; we have

*How the Liver or Lungs impostumate in Wounds of the Head.*

in the Chapter of the *Empiema* given an account of the Formation of an Impostume of the Lungs.

For to have an Idea of that of the Liver, one cannot ground upon more solid Reasons, than to examine its structure in relation to that of other *Viscera*, which are contain'd in the *ABDOMEN*.

*What the  
Liver is.*

The LIVER is the biggest, and most considerable of all the *Viscera*; it's a conglomerate Gland, deprived of all carnous fibres, water'd by a prodigious number of sanguiferous Vessels, among which the *vena porta* doth the office of an Artery, and the Circulation consequently must be very slow there; besides, we are sure that the little Glands which compose it, separate a liquor, which is extremely glewy and viscous of its own nature, which are all the requisite and necessary conditions to retain a matter, which already hath a great tendency to stop and cause some disorder; so that after the heart, and the other organs have prepared and put it in a condition to pro-

produce its effect, it diffuseth it self into the whole mass of blood ; and being the Liver receiveth a great number of vessels, it followeth that the Hepatic Artery, and *Vena Porta*, ( which are distributed through its whole capacity ) having cram'd every glandulous grain with it, according to its disposition and different alterations which it receives in this *Parenchima*, it putrefies it, or makes it schirrous: You must observe, that the *Hydrocephalus* is almost always followed with the same accident, and that in these kinds of Impostumations the shiverings cease most commonly some days before death.

We suspect that the Brain is alter'd when the Fracture is big, and some of the Animal Functions are depraved ; for since our Actions depend on the Functions of the Brain, when ever those are hindred, they shew that the Brain is offended: You must observe, that in all I have proposed concerning Wounds of the Brain, I have not comprehended the hind-part of the Brain ; I am throughly persuaded that  
an

*Wounds of  
the hinder  
part of the  
Brain in-  
evitably  
mortal.*

an Animal dieth presently, as soon as the cineritious substance of the hind part of the Brain be prickt, carried off, or compress'd, because the nerves that furnish us with spirits for the functions of the vital and natural parts, take immediately their origin from thence: This is doubtless the reason that hath obliged Nature to take so much care and precaution, to preserve this part so precious to life; she has plac'd it under two posterior advances of the Brain, for fear it might be interess'd in the great havocks which happen in divers places of the Head; she hath separated it from the Brain, by a membranous Inclosure very strong and thick to hinder it, lest in any concussion it might be compress'd by its two posterior Lobes. Lastly, Nature hath cover'd it behind with a piece of very hard, thick, and irregular Bone, for a defence against outward injuries, and to secure it from all that may be hurtful.

*Prognostics  
of Wounds  
of the  
Brain.*

You must observe, that the more Wounds approach to the *medulla oblongata*, the more mortal they be, because  
all

all the nervous fillaments of the white substance join there together, and a considerable quantity of them is divided.

All this has regard to the Prognostics of Wounds of the Head; but to speak of them more largely, we have only to consider the nature of the Wound, and to examine their Accidents.

If the Fracture be made with a cutting Instrument, it's not so dangerous as one made by a pricking, or that which is caused by a Fall, or contusing Instrument, which cannot break the Skull without great violence; upon which follows always a great Commotion; but if it be made with Gun-shot, it's always mortal, unless the Bullet carry off only some portion of the *Cranium*, without offending the brain.

We know that contused Wounds of the Head are simple or compound; the latter are more dangerous, because accompanied with Fracture. If a simple  
Wound

Wound with Contusion be only superficial, it's cured with Resolutive Medicines, as an *Ecchymosis*. If it penetrate, it requireth Supuration. If the *Pericranium* be rumpled, and that it suffers some divulsions, the eye-lids inflame, and there comes some Accidents upon it, as upon Wounds of the Tendons; to remedy this Inconvenience, we have nothing more to do, but to cut the *Pericranium* to the bone, and to dress the Wound after the ordinary manner. Sometimes it hapneth that the Skull is fractured, the Teguments being undivided; the reason is, that being made of a hard and brittle matter, it cannot resist the fury of the blow, as bodies which are pliable do, and it can break even as a Sword, which in its Scabbard may be broken, without endangering the Scabbard; in this case we make an Incision over the Fracture, more or less, as is convenient, with this circumstance, that we lean not too hard with the Knife upon the fractur'd part, especially if it be a considerable one, lest you offend the brain.

The Prognostics also of wounds of the Head depend on the good or ill disposition of the Patient, the violence of the blow, and the strength of him that gave it with more or less force.

A Fracture that keeps its equality, is not so dangerous as one of several pieces, which press or prick the parts that are under them, particularly when they are engaged or lie one upon another, because the compression is much stronger, and the *Dura mater* suffers more: Besides, when the Skull is so broken, it's always a sign that the Blow hath been violent enough to shake the Brain. If the *Wounds of Dura mater* be broken by the Splints, *the Dura mater* the wounds are very pernicious, because of the Blood spilt upon the Brain, and of the Tention and Inflammation it suffers. The Inflammation of this Membrane tends often to Mortification, because of its hardness and sensibility. *very dangerous.*

Concussions of the Brain are seldom cured if great, because it's impossible to make the Extravasated Matter to come out. *Great Concussions hardly cured.*

*Vomiting  
upon Di-  
lirium  
and Le-  
thargy  
mortal.*

Observe, That if Vomiting come upon it in time of the Dilirium and Lethargy, it's a mortal sign; and if Irregular horrors or shiverings come, it's a sign that the Extravasated Blood putrifies and corrupts the white substance of the Brain.

Wounds of the Cortical part of the Brain are not always mortal, especially when the bigness of the Aperture facilitates the entry of Medicines, unless the Brain has been too rudely shaken; whereas if they penetrate to the white substance, they are always mortal, not only because the principle of the Nerves are hurt, but also because we cannot penetrate unto that substance without cutting thick Branches of Arteries which are concealed in the Anfractuosities of the Brain, from thence cometh the Extravasation of Blood which admits of no cure.

If the wounds of the Skull, considered in themselves, had any Indication like other Fractures, it would be Re-union; but seeing the Skull cannot be broke without the inferior parts receiving some troublesome impression, we must trepan there to introduce

Introduce Medicines, and as soon as we know that the Skull is broke, we ought not to defer the operation. Therefore, whether it be split or broken, it's always true to say, that the *Dura mater* is concerned.

The Fissure causeth a tention, because the *Dura mater* is ordinarily adherent to the Skull, by all the Vessels of Communication, and those which carry the nourishment to the Inferior Table, besides the little Fibres which pass through the Sutures, which is particularly observed in young People. This Tention is soon followed by an Inflammation, for as much as the Vessels cannot long remain stretcht without breaking, and spilling of Blood, which by its abode inflames the Membrane, and if the Inflammation increase, it often Gangrenes.

If in Fracture of the Skull the Splints offend the *Dura mater*, either *Trepans* by pressing, pricking, or rending it, we must needs *trepans* to prevent accidents, or to diminish them, to take away the Extravasated Blood, separate the Pieces which hurt it, and to have liberty to apply there convenient Medicines. *When the Trepan is to be used.*

*The Operation not dangerous.*

It's therefore a Rule which we must follow, that if the two Tables be broke, we must always come to the Operation, though there appear no accident, for besides that the Operation is not dangerous, we have the advantage to hinder symptomes; whereas if the Skull be not alter'd, and some troublesome symptomes happen, we must Trepan, because the Skull being sound, it's easie to see, that the symptomes which follow are the consequences of some ill Concussion of the Brain; besides, we know neither the place, nor existence of the Matter, nor where the Brain suffers. However some say, that provided the Patient can fix with his Hand the place where he feels pain and heaviness, we ought to apply the

*Caution.* Trepan there; which nevertheless the most famous Practitioners dare not undertake, lest they should find nothing there, and so pass for Rash and Inconsiderate. To Cure Wounds of the *Dura mater*, we must Examine their Nature and Cause, we must Bleed to diminish the Inflammation, and apply upon the tumified and inflamed part *Ol. Amigdal. Dulc. Quor. Violar.*

*How to Cure Wounds of the Dura mater.*

*Violar. Lillior. Aquatic.* which we must mix with some *Spirit. Vini*: This attenuates the Blood that's congealed, and the other softens and relaxes the Fibres of the *Dura mater*. You must also endeavour to make the Suppuration of the Exterior Wound very copious, that the Vessels of the *Dura mater* which have communication with the Exterior parts may easily disengage themselves.

As to what regards the affections of the Brain, we know that a great Concussion is mortal, and a little one cured with Bleeding and other Universal Remedies. Extravasation of the Blood is somewhat more dangerous, and it seldom happens that the Vessels are broke without the Brain receiving a great commotion: In that case we have no other help than Bleeding, and general Medicines, observing a very exact Diet. For sometimes in taking these precautions, Nature resolveth the Extravasated Blood, and the Fever groweth less: A great Concussion mortal.

It's not the same thing in Wounds of the Brain, where the Skull is carried off, and where there is Extravasated

vasated Blood, I have said its necessary to Trepan, if the Aperture permits us not to elevate the Pieces above the Extravasated Blood, and conveniently apply Medicines. We know by Experience, that several Patients have been cured, and yet a part of the substance of the Brain carried off; It's true, that Wounds which enter only the Cineritious or Cortical part of the Brain, may be cured, provided the Patient be otherwise well disposed, whereas those of the white substance of the Brain are mortal, for Reasons which we have given.

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## C H A P. XXXII.

*Of the Operation of the Trepan.*

**B**Efore we give a Description of the Operation, it's important to examine all the Circumstances necessary to render the *Operation* successful. It consists in Piercing the Skull, and to make an Aperture near the Fractured part. To execute these two Intentions, it's necessary to know whether all the parts of the Head can endure the *Trepan*; I speak not here of the Bones which are most easie to break, those that know the *Asteology* are instructed therein.

If the Fissure be simple, apply your *Trepan* just near the Cleft, if it be very little, one might *Trepan* upon the Fissure it self, to give an easier vent to the Matter, nevertheless with this Circumstance, which is *A Caution to be observed in Trepaning.* to Anticipate a little upon the side that hath the most strength; which must be observed in all other places of the Skull.

L. 4.

If

If you should meet with any strange body, that were forced down into the body of the Bone, so that it could not be pulled out, you must apply the Crown of the Trepan upon the strange Body to carry off the Piece.

If it be a considerable Fracture, where a part is forced down, you Trepan upon that part where you think most convenient to elevate the Bone, nevertheless you must apply the Trepan upon a part that's firm enough to sustain it without breaking it down. If the first Aperture be not sufficient to lift up all Pieces, you must make a second and a third if it be necessary.

*We must  
not Tre-  
pan the  
Sutures.*

We never Trepan upon the Sutures, especially upon that place call'd *Fontanella*, lest we break the Vessels which pass a-cross, and tear the *Dura mater* which adheres to the Skull, especially in its windings, so that the Blood which is extravasated on one side, hath no communication with the other: Wherefore if the Fracture should cross a Suture, and anticipate upon two Bones, you must Trepan upon both sides.

Tre-

Trepaning is also forbidden directly in the mid'st of the Coronal and Occipital Bone, especially towards their Inferior part, by reason of their Spina's where the productions of the *Dura mater* are fastned, which are let in.

We Trepan not upon the Longitudinal Sinues lest the suppuration should open them, which would eause a dangerous Hemorrhagy.

Neither must we Trepan upon the Eyebrows, because of the *Sinus Frontalis*, and of their Cavities, which are lin'd with a considerable thick Membrane, deckt with an infinite number of Glands, which separate a Viscous Humour that actually fills these Cavities, which makes that the Wounds of these parts do long suppurate. Behold these are all the cases or places of the Skull where the Trepan is to be rejected, you may boldly use it in all other parts. The Ancients made a difficulty to Trepan at its inferior part, because of the weight of the Brain, and the propension it has to get out, but it's a Chymetical Error; being the situation may remedy this disorder. When

L. 5. ever

ever you put the Operation in Practice, this must be observed, *viz.* That the place where the Trepan hath been applied, must always be elevated or the highest.

*What  
manner  
of Inci-  
sions conve-  
nient.*

We must now speak of the Instruments of the Trepan, and of the Means to use them, but before, it's proper to know after what manner the Incisions of the Teguments and Flesh are made.

*If upon  
the  
Temples.*

If it be upon the Temporal Muscle, some make the Incision in the shape of the Cipher 7, or of the Letter V, which they mark with the Nail or Ink, but I do not believe it can be done after this manner without destroying the Fibres. It's therefore fitter to imitate their Rectitude, and to make it somewhat large to have the liberty of placing the Trepan, in dilating the lips of the Wound; Others recommend to make it every where else in form of a Cross, but if the Longitudinal Incision, or in form of the Letter T, suffice to discover the Fracture, and place the Trepan, you must absolutely reject that of the Cross; If the Wound be on the Forehead, you must follow the Wrinkles of it. As

As to what concerns the Temporal Muscle, it hath hitherto been believed, that its Wounds are dangerous, being covered with the *Pericranium*, but it's known that this Membrane exactly covers the Temporal Bone, even as in all other places of the Skull; and that the part which has been taken for the *Pericranium*, is a lengthening of the *Aponeurosis* of the Frontal and Occipital Muscles, which frame by their re-union a kind of Tendonous Cover which anticipates upon the greatest part of that Muscle, and which being prickt or rumpled with some blow, causeth the same accidents which accompany Wounds of the other Tendons; Of the rest the Wounds of this Muscle are no more to be feared than those of another. I pass to the Circumstances of the Operation.

Let's now suppose a Wound at the Superior part of the Parietal Bone. You must first probe it; If you find the Skull discovered, and the Aperture not big enough, you dilate it even to the Bone to examine the Fracture, and you fill the Wound with dry Lint, to absorb the Blood, which

which might hinder the sight whether it be of danger. If any Artery should bleed much, you would be forc'd to make a Ligature, and leave the Wound till next day.

If the Fracture be considerable, and some splints of the Bone forc'd down, so that you were obliged to elevate them, it's the part of a prudent Surgeon to leave the Dressings for 5 or 6 hours till the Hemorrhagy be a little stop'd, and then he may choose a fit place to apply the Trepan.

How to  
use the  
Trepan.

When you have fixt on a place, you stop the Patients Ears with Cotton, lay his Head on some firm place, scrape the *Pericranium* off, lest you tear it with the Teeth of the Saw, you cover the lips of the Wound, then you choose a Crown of a Trepan proportionable to the hole you intend to make, but first you make a little hole with the Perforative Trepan, to fasten the Pyramid which you put into the Crown; afterwards you turn the Trepan, and saw the Skull, and when the Trepan hath taken sufficient hold, you take the Pyramid off, lest you hurt the *Dura mater*,  
then

then you go on sawing the Skull, taking care from time to time to cleanse the Teeth, and the hole you have made, and observe whether you saw equally, so you finish to pierce the Scull by several turns; if you perceive that the Crown penetrates more in one place than another, you lean more on that side which is not so much penetrated to equalize the Aperture.

You know that you are come to the *Diploe* when the Teeth of the Trepan are Bloody, and seeing the Interior Table of the Scull is much thinner than the Exterior, and often adherent to the *Dura mater*, especially in young People, if you should not take care to turn the Trepan softly, and to shake the Piece at every turn of the Saw, you would be in danger to hurt the *Dura mater*; When the Piece is disengaged, you take it off with the Piercer or Myrtle Leaf, and you scrape the circumference of the Aperture with the Lennicular Instrument, with which you press a little the *Dura mater*, to facilitate the Issue of the Extravasated Blood, and to introduce more common-

modiously the necessary Instruments, as the Levatory to elevate the Pieces that were depressed.

If the Piece be extreemly adherent to the *Dura mater*, you separate it with the Myrtle Leaf: Several Practitioners recommend to let it alone till its fall be procured by Suppuration; But since these ties are only in young People, who have these parts always moist and relaxt, they may be easily separated with the Spatula without any violence.

When the Piece is taking off, we ordinarily give vent to the Extravasated Blood upon the *Dura mater* in bidding the Patient shut his Mouth and Nose, and keep his Breath.

This ingenious manner of pressing out the Blood, is an effect of the Expansion of the Lungs, and levelling of the *Diaphragm*, which presses the Descending *Aorta* that passes between its Tendons, and forces the Blood to flow into the Ascending *Aorta*, and so mount to the Head by the *Vertebral* and *Carotid* Arteries, with such rapidity, that the Brain riseth with so much strength as to oblige the Extravasated Blood to flow through

through the Aperture of the Skull, or to appear at the Passage so that it may be absorb'd with ease.

Having disingag'd the *Dura mater* of the Burthen which oppressed it, you you wet a little piece of fine Linnen in *Mel Rosar* with *Spirit. Vini*, which you introduce between the Skull and *Dura mater*, as well for to Humect and dry as to resolve the Matter : You pass through the midst of it a Thread which keeps it from going too far under. This is call'd Sindon, it must be somewhat bigger than the Aperture, that the Medicines may have room to extend themselves on the neighbouring parts, and the *Dura mater* not to be hurt in the Motions of the Brain against the edges of the Skull : Upon this Sindon you put another of Lint dipt in the same Medicine, you fill the rest of the hole with dry Lint, and cover the Bone with it, and the rest of the wound for the first days is drest with Digestives able to procure a strong Suppuration.

We have already made you observe, that great Suppuration of the Exterior Wound very much contributes

*How to dress the Dura mater.*

*Great Suppuration very convenient.*

butes towards the easing of the *Dura mater*, through the frequent commerce that is between the Exterior and Inferior Vessels.

You shave the Head for to Embrocate with *Ol. Rosat. & Spirit. Vini*, you make use of *Emplast. De Betonica*, or *Andreas e Cruce*, of a Compress temper'd in strong Wine, and useful Bandage; you dress the Wound the following days with the same care.

If the Splints be separated you take them away, if they stick to the Skull and cannot be replaced, you cut them off with the Incisive Pincers.

The *Dura mater* is sometimes so inflamed, that it rises beyond the Aperture of the Skull in spite of all the precautions that one can take, and seeing it's dangerous to Trepan too much, nothing but Bleeding, Clysters, and an exact Dyet can stop the progress of the Inflammation.

If Blood or Matter be got between the Membranes, there's no other remedy than to give vent to the Matter. To execute which design with prudence you arm a Lancet, and dexterously open the *Dura mater* without the knowledge of the by-standers.

When

How to  
penetrate  
the *Dura*  
*mater*.

When the *Dura mater* and the Brain are hurt, there arises very often (in the last days) upon it a Fungus, like a Mushroom, which increaseth more or less according as the Matter which contributes to its generation is more or less unctuous.

The Famous *MALPIGIUS* pre- Malpi-  
tends, that the displacing the Glands gius's  
of the Brain, and the little Nervous Opinion.  
Pipes, frame this Excrescence. But  
without running to the disordering of  
the Glands, is it not more reasonable  
to believe, that it's bred from the  
abundance of the Fat, and Oleagi- Cause of  
nous Matters, with which the Brain a Fungus.  
is actually water'd, as we have suffi-  
ciently proved in several places of  
this Treatise; which Experience also  
every day shews us in those upon  
whose *Dura mater* Oyls are outward-  
ly applied.

In this Inconvenience you must dry it with Spirit of Wine, or Tinct. Aloes, which dissipates its Humidity, and forsake the use of Oynments.

If these Remedies be not sufficient How to  
to extirpate the Fungus, use the soft- Consume  
est Catheretic's, as Turpentine in a Fungus.  
Pouder, Pul. Irid. Flawent. Alum.  
Ustum.

*Ustum.* some time you may apply  
*Precept. Rub.* In using these Powders  
 the Flesh must be also a little com-  
 press'd, or it will not be consumed.

After these Medicines have per-  
 form'd their vertue, a Decoct. of  
 Traumatic Herbs in White Wine is  
 very advantageous, to which add  
*Mel. Rosat.* more or less according as  
 it's necessary to Humect or Dry up.

You must correct the Air of the Pa-  
 tient's Chamber by the use of Fire, es-  
 pecially when you dress him, & apply  
 the Medicines as warm as you can.

When the Flesh is quick and firm,  
 you must maintain it in that condi-  
 tion, but when it's too soft you must  
 compress it, or use more drying Re-  
 medies.

Whilst you are curing the Interior  
 after this manner, you must Exter-  
 nally use the best Traumatics, and  
 apply upon the Bone such Remedies  
 as hasten the Exfoliation, as *Spirir.*  
*Vini*, in which *Euphorb.* is infused,  
 which is admirable to hasten Exfolia-  
 tion: It must be always used before  
 the Flesh which grows upon the  
 Brain surmount the Aperture, and  
 according to the nature of the Ac-  
 cidents

eidents which happen, general Medicines ought to accompany the Topics.

C H A P. XXXIII.

*Of the Aneurisma.*

**A**N *Aneurisma* is a Preternatural <sup>Two sorts</sup> Tumor form'd by the dilata- <sup>of Anev-</sup> tion of the Artery, or by the Rup- <sup>risma's.</sup> ture of its Tunicles, which makes two kind of *Aneurisma's*, the true and false. The true one is that which <sup>True and</sup> doth not abandon the Pipe of the <sup>false.</sup> Artery, and which hath correspondence with the Blood, which the Heart sends continually there: On the contrary the false possesses the nigh parts, and hath no communication at all with the Arterial Blood.

Concerning the Internal cause of <sup>Internal</sup> the true *Aneurisma*, we can attribute <sup>cause of a</sup> it to nothing but to the action of a <sup>true A-</sup> sharp and corrosive Humour which is <sup>neurif-</sup> separated from the Glands that are <sup>ma.</sup> spread about the Vessels, and which insensibly gnaw the outward Coat of the

the Artery, so that the Blood by reiterated shakings, disposes the Inferior Tunicle to extend and dilate it self, and after several Impulsions not being in a condition of resisting its motion, it gives way, and obeys, till at last a Tumour is form'd, which is call'd an *Aneurism*. Thus I conceive all sorts of *Aneurism's* to be form'd, which naturally happen on the Neck, Arms, and several other parts,

We also observe, that these kinds of Tumours possess rather Lean and Atrophiated Persons, whose Blood is loaden with salt, than those that are fat and pampered.

*External  
causes of  
a true  
Anev-  
risma.*

The External causes of a true *Aneurisma* cometh from a Punction, made on the Exterior Coat of the Artery with a Lancet, Sword, or other like Instrument, or from some Blow, &c. or finally from the strong Impression which sharp and Corrosive Medicines, or Humours, which lurk about the Vessels, make upon the same Exterior Coat; it's easie to comprehend that all these causes are capable of weakening the Pipe of the Artery, and the Blood beating without intermission, extends and forceth

Chap. 33. Of the Aneurisma. 241

forceth outwardly the Pipe, and so produceth a Tumour.

The false *Aneurisma* is caused by *Cause of the false Aneurisma.* the total ruption of the Tunicles of the Artery, which gives vent to the Blood to Extravasate it self between the Porosities of the Flesh and Skin, and so forms a Tumour, which is followed by troublesom accidents, because the Extravasated Blood being no more in motion, ferments and suffers alteration, which is almost always followed by the Marks of Mortification: These two kinds of *Aneurisma's* increase more or less, according as the action of the sharp Juices, Contusion, Aperture of the Vessel, and Impulsion of the Blood are more or less considerable.

The Signs of the true *Aneurisma* *Signs of a true Aneurisma.* are sensible pulsation of the Tumour, and its softness, when it's pressed with the Fingers it disappears at the same time, but as soon as you give over pressing, it comes again into its first state. The colour of the Skin is not changed; because the Blood which maintains the Tumour keeps its liquidness, by the meeting and mixture of new Blood whose motion is  
cen.

continual. In its least increase or bigness, it's commonly as big as a Nut, or Egg at most; some Authors assure us, that these Tumours augment sometimes so much that they break, nevertheless we know that some have kept them all their lives; and that in most Persons who are troubled with them, the part of the weaken'd Artery becomes so hard and callous, that it resists all the efforts one can make.

*Cause of  
Induration  
of the  
Artery.*

Though this Ossification of the Artery seem very difficult to explain, one may nevertheless believe, that the saline, pungent, and most exalted particles of the Blood, penetrate the lesser porosities of the Fibres of its Tunicle, and they pass and mingle themselves with the nourishing Juice of the Artery, and so contribute towards its Ossification.

But the reason which to me seemeth most evident, and best grounded, is, that the Blood which maintains the *Aneurism*, and which is in a continual fermentation, must by its motion increase the heat of the part which insensibly dryeth and hardens the Fibres of the dilated part in dissipation.

sipating and rarefying the humidity which waters and makes them dull : That which fortifies more this thought, is, that the *Aorta* groweth bony (sometimes in old People) at its exit from the left Ventricle of the Heart, either through the little heat that's left there, dries it, or because their Blood hath lost its Viscosity which is necessary to preserve its spring : Notwithstanding Experience shews us, that it's Ossified in some Persons.

The Signs of the False *Aneurism* Signs of the False Aneurism. are opposite to those of the True ; In the False the Pulsation of the Artery is very deep ; the Skin almost livid, the Tumour is not so high, nor round as in the true one, but it takes up more room, it giveth not way so easily in touching as the true one. The most convincing signs of the Arteries being opened, is, when the Blood comes out impetuously and by jumps, which convinces us, that its motion is continual and unequal.

This inequality of the course of the Blood proceeds from two contrary motions ; the first depends on the strong constriction of the Ventricles  
of

of the Heart, and the second from the spring of the Arteries. But being the Impulsion of the one is much stronger than that of the other, it happens, that as the Heart driveth the Blood vigorously forward in the time of the Systole, the Arteries by their Elastic Virtue beat and drive it back weekly in the Diastole, which proves the irregularity and continuation of its motion.

*Signs of a  
Wounded  
Artery.*

If you perceive that you have unluckily opened one of the Tunicles of the Artery, which is known by the resistance of the blow, by the elevation and the violence of its pulsation, which is presently communicated to the Vein, and which obliges the Venal Blood to come out by jumps as the Arterial Blood, but is not so brisk, lively, or shining, and is less swift; you must have recourse to Phlebotomy which impedes its motion, and by this means hinders the progress of the Tumour, you apply thereon a little Compress, in which you put half a Bean, which presses only the Aperture, over that you lay another a little bigger, after this manner you apply several Compresses

preſſes gradually bigger, which you keep on with a fitting Bandage, and on the neighbouring parts lay good deſenſatives.

There are ſome which make uſe of a Double to compreſs the Aperture of the Artery, but this practice is not approved, by reaſon that being obliged to tie the Bandage ſtrait, the Double taking more room than half a Bean, which only compreſſes the Aperture, it's to be feared leſt the circumference of the wounded part Gangreen; but to ſupply the want of this ſtrong compreſſion, you place at the Internal part of the Arm, all along the thick Veſſels, a Longitudinal Compreſs which you ſecure with the Creeping Bandage.

*A certain  
piece of  
Money.*

This Compreſs produceth very good effects; for beſides that it moderates the rapid ſtream of the Blood, and by this means you may avoid tying the Band too tight, it helps alſo the reunion of the Artery, becauſe the Impulſion of the Blood being only weak, the Aperture ſeparates very little. When the Patient begins to have ſtrength, you muſt reiterate Bleeding, for reaſons

we have alledged, you take off the Dressing as late as you can, because in a very little time it increases considerably.

But the Accidents which follow upon a false *Aneurism* are ordinarily violent and cruel, being Gangreen and Mortification are its mournful Consequences, you must not differ the Operation unless the use of the Compresses which are applied there, and other precautions which must be taken, stop its progress, or the Resolutive Medicines which we use, make the Extravasated Blood re-enter again in commerce with the Liquor, or be discust by insensible perspiration, in attenuating and rarefying its Molecule lying between the porofites of the flesh; on the contrary a true *Aneurism* may be kept all ones life time, or at least some considerable time; for which reason one may prolong the Operation in laying on the Tumour some Compresses fortified with a Bandage, without the Patients being in any danger, unless he resolve to endure the Operation. This, as hath been said, grows to a certain bigness, whereas the progress

gress of the false is not limited :  
Lastly, if in spite of all precaution, and all the care that can be taken in both kinds, you succeed not, you are obliged to perform the Operation.

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C H A P. XXXIV.

*Of the Operation of the Anevrism.*

**T**His Operation is practised three *Three*  
different ways. The first is by *ways of*  
the Vitriol Button, but the worst is, *the Operation of*  
that as the Vitriolic particles melt, *an A-*  
they spread themselves upon the Li- *nevrism.*  
gaments, and adjacent Tendons, *1. By the*  
which they carry off, rend, and *Vitriolic*  
cauterise, till at last the Patient is *Button.*  
lamed, being the part groweth incapable of its ordinary motions.

The second is to disgorge the Tumour before you make the Ligature of the Vessel, but behold, as I think, the surest method.

The Patient being plac'd. you lay on the midst of the Arm a strong Compress, sustained with a Ligature

M 2 through

through which you pass the Tourniket, making several turns, by which means you benum the Arm, stopping the passage of the Blood and Spirits.

The Surgeon Inciseth with a Lancet the Tumour following the length of the Artery, which must be separated from the Nerve, to have the liberty of tying the Artery half a Fingers breadth above the Aperture with a little strong wax't Thread.

You must observe, that in a true *Aneurism* the Tumour regulates the place where you must make the Ligature, whereas in the false we are obliged to loose the Turniket to know positively whence the Blood comes, which is the most important circumstance of the Operation, for to stay the Blood, and to avoid making the Ligature upon the Aperture of the Vessel, instead of making it a little higher, because the Blood by its impulsions would not fail to dilate the weaken'd part, and to bleed afresh. For this purpose you pass a Needle over the pipe of the Artery, make first a single knot, on which you place a little Compress which you fasten with two other knots.

Most

Most make another knot in the lower part of the Artery, because of the Branches of communication, and since it being a precaution not to be despised, one may use it.

The Ligature being made, you loose the Tourniket: If the Blood be well stopt, you open the Tumour to empty the Blood, and fill it with Dossels arm'd with Astringent Powders, as *Vitriol. alb.* to consume the Bag more easily you cover the rest of the wound with Boulsters, accompanied with a Plaister, Embrocation of *Ol. Rosar.* Defensatives all along the Arm, with Compresses temper'd in strong warm Wine, with the Bandage.

Some time afterwards you must Bleed the Patient, if his strength permit, you stay two or three days without taking off the Dressings, and you leave the Dossels at the bottom of the Sac 3 or 4 days longer, lest in taking them out you bleed afresh, and procure a fresh suppuration.

The situation of the Arm, which seems a thing of little consequence, must nevertheless be regarded as very advantageous for furthering the cure.

The Arm must be a little bended, and the Hand elevated on the Pillow, that the circulation be more free: But you must particularly recommend the Diseased to bow and stretch it from time to time. We daily see that several become lame for not having moved the Arm or Leg during such Indispositions. The cause of this accident comes from the little motion of the slimy matter which be-daubs the Joints: This Slime is of the consistence of the White of an Egg, and which transpires from the Ligaments and Glands of the Joynts, serving to entertain the supple Ligaments, and to smoothe the shining Cartilages, as well to facilitate the motion, as to hinder the parts from being wasted by their continual attrition, but from the moment that this Matter is at rest, and no more fluid or liquid by the diversities of motion, it groweth thick and hard by the heat of the part; so that the Ligaments and Cartilages being no more humected by that Liquor, they dry up, loose their Elastic Virtue and Humidity, till at last they grow incapable of motion.

Some-

Sometimes it happens in old Rottenness and Fistula's of the Joynts, that the Purulent and Malign Matters gnaw the Ligaments and Cartilages, and gives occasion to the Saline Juice, which exuds from the bony Fibres, to unite the extremity of the two Bones, and frame a kind of Anchilose, which is much more defectuous than the precedent.

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## C H A P. XXXV.

*Of Gangrene and Sphacel, which occasions the Amputation.*

Several Authors have treated of the *Gangrene*, particularly *Willis*, *Etmüller*, and *Silvius*; and I believe no body doubts, but that all whatever our new Discoverers have advanced upon this Subject in their Exercises, is nothing but a perpetual pillage of what these great Men had spoken. To speak of it methodically, we must first give an Idea of the Vivification of the parts, and of the Mortification, which is its opposite,

M 4

posite, we must relate all particulars which cause a Gangrene, and seek all the means to illuminate them with Reasons grounded on the Oeconomy of the Blood, and upon some Observations which Experience Authorises.

*Cause of  
Virifica-  
tion.*

To know how the parts are Vivified, you must consider that the heat and life of Animals consists only in the motion and fermentation of the principles of the Blood, that this Fermentation and Motion, as well Circular as Intestine, are entertain'd by the pulsation of the Heart and Arteries, by the motion of the Muscles, and action of the subtil and penetrating particles of the Air which we breath.

It is in effect the spiral and nitrious particles of the Air which attenuate and subtilize the particles of the Blood in mingling themselves intimately together in the substance of the Lungs, which make them wave upon their centre, and which give them all their vivacity and influence which is necessary to the maintaining of their intestine motion, and consequently of their heat and Life.

*It's*

It's certain then, that it's the Blood agitated by these means, which vivify and animate the parts, repairs the continual losses which they suffer, furnishes the matter of the Spirits, and of all the different Liquors that are subtilized in passing through a 1000 different Strainers : In one word, it's the Master Spring that makes the whole Machine go.

This being so, it's not hard to conceive that it is from the actual distribution, presence, and action of the spirituous, and nourishing particles of the Blood, in a part, on which entirely depend its motion and life ; so that this dispensation coming to cease, or be interrupted for some moments, one feels no more there, either heat, motion, or life. To convince our selves of it, we must only examine that which happens every day in Syncop's, where we see that the pulsation of the Heart being hindred, and the circulation of the Blood stopt, all the Extremities grow cold, the Face pale, and sometimes livid, and the whole Body deprived of feeling and motion ; but according as the Heart recovers

*Cause of  
Mortifi-  
cation.*

its motion, and the Blood conveyed into all the parts, they recover their heat, motion, and life. It's therefore evident, that the life of a part depends on the presence and motion of the Blood; and on the contrary I say, that the cause of a Gangrene and Mortification of a part is doubtless the absence and want of these spirituous and nutritive particles in the same part. This is the Explication which the Illustrious *Etmuller* gives of it in *Tome 1. operum, pag. 587.* where he says, *Causa Gangrenæ, & sphaceli in genere sunt & quæ quacumque ratione sanguinis, & spirituum vitalium distributionem inhibere valent.*

It is a question whether the Animal Spirits which run from the Brain through the Nerves, are not likewise interested in a Gangrene. I say, that the most causes which work upon the Blood for the production of a Gangrene, may in the same manner work upon the Animal Spirits; but in the meantime the Gangrene only depends on the alteration which happens unto the Blood. This is proved because a Gangrene is a privation.

vation of Life, or at least a disposition next to a Mortification; now the Functions of Life depend chiefly from the Blood, whereas the Animal Functions depend on the Animal Spirits. The Nerves may be obstructed, and the Animal Functions cease in a part without Mortification, as is seen in Paralytics. It's true then to conclude that a Gangrene depends only on the default of the vital and spiritual particles of the Blood.

Those that will have the Animal Spirits to have much share in the Gangrene, as well because a mortified part is deprived of motion and feeling, as because a great pain causeth an Inflammation, and sometimes Mortification, do not consider that the weight of the courser particles of the Blood, which lies in a part, presses the Nerves, and so interrupts the course of the Spirits, and the pulsation of the Artery is no more felt; for as Nature delights to glue the Arteries to the Nerves, and that she makes use of the pulsation to oblige all the little Nervous Fibres to discharge the Spirits which they

*Arteries  
for the  
most part  
joyn'd  
with  
CON- Nerves.*

contain, so it will be always true to say, that the Gangrene succeeds great pains and inflammations, and that the privation of motion and feeling come chiefly from the Blood; since it's that which hinders by it's stay the distribution of the Spirits. I deny not that the want of Animal Spirits in Paralytics may give occasion to a Gangrene to seize the sooner on a part, as we shall see in the following Discourse.

After all I have said, it's easie to comprehend that the heat and life are precisely contain'd in the Blood, since the dissipation and absence of it's spirituous and nourishing particles cause the Gangrene, and that their presence and exaltation entertain the natural heat.

*True and  
only cause  
of a Gan-  
grene.*

I say then in general, that the cause of a Gangrene and Mortification, is the dissipation & absence or concentration of the spirituous particles of the Blood, which must vivify the part, or at least the interruption of the course of the same, and it's coagulation. These causes act for the most part separately, it may also happen that they act together to  
cause

cause a Gangrene, as I shall make you observe.

Let us examine all these Causes, and first see what is this alteration of the Blood, that is deprived of its spirituous particles, from which follows Gangrene and Mortification.

To give a just Idea of it, let's consider the changes that happen to Wine. All the World agrees, that *A Com-* the good condition of Wine consists *parison.* in the exaltation of its most subtil and spirituous principles, as long as these principles have the upper hand, the Wine remains in a state of gentle and natural fermentation, and consequently of goodness.

But if it happen by what cause soever, that they be weaken'd and dissipated, and the acid salts, or salt sulphurs take the upper-hand; then it is that the Wine grows sower, and at least sharp and very disagreeable. It happens also very often, that after the loss and dissipation of the spirits, there remains nothing in the Wine but Earth and Phlegm; it's without taste, and is nothing but a dead Mass and barren Liquor, which in *Latin* is call'd *Vappa*, *Vinum pendulum*, which  
is

is as it were the Cadaver of the Wine. Finally, it happens, that in cold Weather the spirits of the Wine concentrate in the midst of the Vessel which contains it, so that all the parts in the circumference being deprived of the spirits congeal. I say, that when the spirituous particles of the Blood are dissipated, or concentrated, it receives almost the same alteration. If the acid salt, or salt sulphurs take the upper hand, it becometh acid or rank.

*In tract.  
de ferm.  
p. 68.*

*Willis* uses the same Example when he explains the alterations that happen to the Blood, in comparison to those that happen to Wine. *Cum a longa fermentatione spiritus absumi, ac tandem deficere incipiunt, inducitur deflectionis status, quo vina alique Liqueures, aut in vappam transeunt, aut demum sale vel sulphure nimium exaltatis, acetosi aut rancidi fiunt, pariter & sanguis dum in vasis circulatur, juxta triplicem hujusmodi Diathesin considerari potest, &c.*

Finally, when all the spirits are dissipated, that the Blood degenerateth into a dead inspir'd mass, incapable of any fermentation; and whenever the Spirits are concentrated  
in:

in great cold, they abandon or forsake the exterior parts, which are then only irrigated with Blood deprived of vital and spirituous particles. This last state of the Blood answers to turn'd Wine, whence depends the mortification of a part in certain cases which I am going to propose.

First, we observe, that old People dye very often of Gangrenes, and that that it begins by the Extremities, and follows through the whole Body in spite of all Remedies that may be used. The same thing happens through long abstinence, and after all sorts of too great evacuations.

*Cause of  
Gangrene  
in old  
People.*

To give an account of this *Phenomena*, you must observe, that the Blood can, no more than other Liquors that ferment, always remain in the same condition. It's active principles are yet intangled in infancy, they get loose in our youth, remain in a state of exaltation during a certain age; but at last they are dissipated, and begin to abandon their subject in old age; therefore old People become by little and little

in

incapable of their ordinary motions, they loose insensibly their vigour, till at last their life, in loosing their heat and spirits.

This being so, it's not hard to explain why old People who dye after this manner are always troubled with Gangrenes in their last days, the reason is because their Blood becomes a Languid Mass, which no more contains any character of life, and which in effect is no more than a Cadaver of Blood; This kind of death one may call natural, because it happens not but when the heat is extinguished of it self, and by degrees. *Ideoq̃ mori simul dicuntur, & extingui.* In this manner it is that a Mortification of the Blood and Spirits happen after an Hectick Fever, long Fluxes, great Abstinences, too great Labour, and generally after all sorts of great Evacuations; because in these occasions the Matter designed for the entertaining of natural heat, is dissipated, or is not enough furnished to supply the loss of it which it actually suffers.

Of the rest, though in this state of the Blood the Gangrene be almost  
uni-

universal, and need no other cause to manifest it self, yet sometimes it happens, that the slowness of the circulation gives it occasion to attack certain parts, there is a very particular case of it in the 46th Chapter of the Second Book of *TULPIUS* *Observation.* *his Observations.* Where he relates, that an old Man was reduced to such a languishing condition, and so great a weakness, that the least impression caused him to have a Gangrene, he dared not so much as sit down, nor lean on an Elbow, nor even set a Foot on the Ground, or press any of his Members, but there appeared some marks of Mortification which followed the Gangrene. This Observation is rare and singular: We must confess that his Blood was mightily exhausted of spirits, since a slight compression only was capable to produce a Gangrene in a part.

We need not search any where else for the cause of a Gangrene which happens to the Legs and other parts of Hydropics, what I have said explains it sufficiently, besides we well enough conceive that the serous Blood is deprived of spirits, that it  
moves

moves more slowly in the Extremities than any where else, and consequently the heat must rather be less'n'd in these parts than in others, as I have made you observe when I spoke of the Dropsie, besides the serosity filters in so great a quantity between the Fibres and the parts, that it may by its weight press the Vessels, and so cause a Gangrene.

Secondly, great Cold causeth often Gangrene and Mortification in the Extremities, especially the Feet, Hands, Ears, and Nose, particularly in Persons obliged to march in the Snow during excessive rigours of Winters, as those which Travel in the Northern Regions.

*How Cold  
causes a  
Gan-  
grene.*

To explain this *Phenomena*, you must only remember what I have said in the comparison of Wine, where we have seen that the spirits of Wine are concentrated by the cold; and that the exterior parts finding themselves deprived of spirits, freeze. This happens to a Bottle of Wine exposed to a very cold Air: You may observe in breaking the Bottle, that the spirits have retired to the center, and preserved their fluidity while all the rest is congealed.

I say that the same thing happens in the Blood by the rigour of cold, and while the spirits retire to the center of the Animal, the exterior parts remain gangrenated, being only irrigated with a dead and insipid Phlegme, which congeals in the very substance of the parts.

It's easie to comprehend, that at the same time the parts feel the pinches of the cold, they retire, being compress'd by the action of the Air, which first causes those quick and penetrating pains, and hinders the Blood from continuing its motion in those parts, therefore lying there still, it insensibly stops every passage, and causes an entire mortification.

*Hinc Interdum (saith ETTMULLER)  
ex frigore extrinsecus Irruente partes  
Gangrenosa fiunt.*

So much for what regards all kinds of Gangrenes that depend on the dissipation and concentration of the spirits, now I come to those that depend on the interruption of the course of the Blood, and its motion.

First, Tumours, Fractures, and Luxations, may cause a Gangrene in a part, by compressing too hard the Vessels

Tumors,

Fra-

ctures,

Luxati-

ons, &amp;c.

may cause

a Gan-

grene.

Vessels that convey the Blood there; I confess that this kind of Gangrene is rare, because the Vessels communicate themselves in so many places, and there coming so great quantity of different branches from them, that it's difficult that all the supply of Blood should be hindred in a member.

Observation.

Nevertheless *Fabritius Hildanus* assures us, that he hath seen a Man who was attack'd with a Gangrene in both Legs, and his Feet were always cold and benum'd; so he died without a Fever, & without any other symptoms: His Body being opened, there was found a schirrous Tumour in the Region of his Reins, over the division of his *Iliac* Branches. This Tumour press'd first slightly the Vessels, and caus'd the cold and benumbing of the Legs, but as it grew, it press'd the Artery and Vein so hard, that the Blood could no more descend into the inferior parts to vivifie them. Concerning Fractures of Dislocations, it may happen that the head of a Bone or some pieces may compress the Vessels so hard, as to hinder the passage of the Blood; for the same reason Bandages, &c. used in

Too tight  
Bandages.

in Fractures, and Luxations, strong and close Ligatures of the Vessels may cause a Gangrene, especially if one makes it on the great Trunks, unless the Branches which communicate together in several places, furnish the Blood that's necessary for the vivification of the parts. *Ettmuller* saith, *Nimis firmæ Ligaturæ externæ interdum hoc malum inducunt, in quod fit interdum si in ossium Fracturis Locus Fractus recte nimis Ligetur.*

In all these cases it's very easie to see, that the mortification depends simply on the interruption of the course of the Blood, without the concurrence of any other cause; but you will see in what follows, how the ill disposition of the Humours may augment, and even produce this kind of Gangrene.

Secondly, a Gangrene happens often upon the Buttocks of those who have had long Sicknesses, and that are obliged to lie long on their Backs, first the *Cutis* begins to rise, afterwards there happens Inflammation in the Flesh, which ends in Rotteness and Gangrene. The first is caused by the sole compression of the Vessels

*A Gangrene may happen by long lying on the Buttocks, &c.*

Vessels in the part; but if at the same time the Patient involuntary sheds his Water and Excrements the Gangrene comes sooner, because they gall and heat the parts by their acrimony, and so increase the Inflammation, and consequently the Inflammation and Gangrene.

Great In-  
flamma-  
tions,  
Contusi-  
ons, &c.  
may cause  
a Gan-  
grene.

In the third place, nothing's more common in the practice of Chyrurgery, than to see Gangreens follow great Inflammations, Contusions, and even *Aneurisms*, when ever the Tunicle of the Artery is broke, and the Blood extravasated between the Muscles; I say, that in all these occasions, if the Blood be extravasated in great abundance, it must needs lie heavy on the part, and press at the same time the Blood Vessels, so that it entirely stops the passage to the new Blood, which comes to irrigate and vivifie the part. Behold this is the period of Inflammations proper to produce a Gangrene; and as there must be great abundance of Blood to compress hard the Vessels, so it happens only upon great Inflammations. If I say that in great Inflammations the Extravasated Blood compress

press the Vessels, it's not a simple Imagination only, but a constant Truth; since the Pulse ceases to verberate, at the same time the part begins to gangrenate, and it's red colour grows pale, livid, and black; which clearly demonstrate that the sanguiferous Vessels are compress'd, and the access of new Blood hindered.

In the 4th place, a Gangrene may *Reper-* happen upon the least Inflammation, *cussive* even on *Erisipelas*, when ever too *Astring-* strong Repercussive, Astringent or *gent Me-* Emplastic Medicines are inconsiderately applied. *dicines* *improper-* *ly applied*

To conceive this well, you must *may cause* observe, that the Extravasated Li- *a Gan-* quors transpire very much, and that *grene.* this Transpiration does extreamly discharge the diseased part, of the quantity of Humours which it contains; so while the Pores are open in Phlegmons and Erisipelases, and the most active and agitated particles of the Bile and Blood evaporate, the part always discharges it self of some of its Burthen, so not much fear of Gangrene. This is the reason why in the Southern part of *America* there

there never was seen a Gangrene come upon Wounds or Inflammations, because the great heat of the Countrey opens the Pores of the Body ; but when the Pores are closed by Astringent, Repercussive, or Emplastic Medicines, and the transpiration utterly impeded in the part, the Tumour increases, the part retains all those particles which would have escaped through the Pores ; the Extravasated Humours being in a greater quantity, proportionable to the part which contains it, compresses the Flesh and Vessels, and of necessity causeth a Mortification.

Behold the true cause of Gangrene which comes upon Inflammations, Contusions, Aneurisms, and Erisipelas ; all these causes have been very well observed by Ettmuller, when he says, *Hinc est quod vix sapius oriuntur Gangrene, & sphaceli, quam ex Inflammationibus male curatis, imprimis si partis Inflammatæ ; per Emplastica imprudenter admota, impediatur insensilis transpiratio, tunc sanguis extravasatus stagnat, corrumpitur, ex toto putrescit, & partis Inflammate Gangrenam post se trahit. In primis Erisipelata per ungt. oleosa,*

*ac muilaginosa insulsæ, tractata subito serpentem inducunt Gangrenam.* But

these causes having produced their effect, there are that augment it, and which give even occasion that it be communicated to the nigh parts, it is the corruption of the Blood and Extravasated Humours in a simple Inflammation. When the Blood is extravasated, and cannot be discust, it changes into Pus; This change is not only caused by the action of the principles of the Extravasated Blood, but also by the soft influence of the Blood and Spirits which are contain'd in the neighbouring parts; This makes that the Pus is not altogether a strange substance, and enemy to Nature. But as I have shew'd that the access of the Blood is entirely press'd towards the Gangren'd parts, and the circulation very often intercepted, it so happens that the Extravasated Blood is so far from being converted into Pus, that it degenerates into a virulent Sanies, which first causeth Blisters upon the part, and then by its acrimony gnaws the Gangrened parts, and insensibly corrupts those that are sound;

N            which

*Why the  
soft parts  
Gangrene  
nate soon-  
er than  
other.*

which makes the Gangrene become so angry, that it attacks even the parts that suffer no Inflammation. Of the rest, the Gangrenes which follow upon Inflammations attack rather the soft and fungous parts, than other, as the Gums, Lips, *Vulva*, and *Membrum Virile*, Intestine and Brain. The reason is, these parts being very soft and spongy, imbibe a greater quantity of Humours; besides, the most of them have no Muscles that might squeeze the Blood, which makes it easily lie caking there.

*Ulcers,  
Wounds,  
Scorbutic  
spots, and  
sharp Me-  
dicines,  
may  
cause a  
Gan-  
grene.*

Fifthly, Gangrene comes upon Ulcers, Wounds, Scorbutic Spots, and upon the Application of sharp and corrosive Medicines, which happens two ways; 1. When pain, which accompanieth all these symptoms, causes often great Inflammation, on which followeth Gangrene. 2. From the Actual Cauteries, from *Pus* and *Saries* coming from gnawing Ulcers, from Scorbutic Spots, and from sharp and Corrosive Medicines, which cauterise the Cutis and Vessels, so the Blood being no more sent into the parts, they lose their motion and life.

Finally,

Finally, all Authors do admit a *Maligni-*  
 malign and occult cause of a Gan- *ty may*  
 grene, from thence (they say) comes *cause*  
 the Gangrene in the Plague, as Car- *Gan-*  
 buncle, which sometimes in 24 hours *grene.*  
 time causes an entire mortification of  
 a part; To the same cause they at-  
 tribute the Gangrene which happens  
 on Malignant Fevers, and sometimes  
 after the Small Pox, by a *depositum*  
 (or *Crisis*) of the Matter which the  
 Disease makes in some part. Lastly,  
 it's this way which they pretend to  
 explicate the Action of Poysons and  
 Bites of Venemous Animals, which  
 they say will cause a Gangrene.

But (without having recourse to  
 the Malign and Occult qualities of  
 the Plague) are we to wonder at  
 Carbuncles causing a Mortification *Why a*  
 in any part, since the Humours which *Carbuncle*  
 produce them are in the highest de- *mortifies.*  
 gree of Sharpness and Corrosion; It  
 gnaws the Flesh, and cauterises the  
 Vessels; so it's evident the part must  
 mortifie. The same thing may be  
 said of the Matter of Malign Fevers,  
 and of the Small Pox, where the  
 Blood is loaded with sharp and malign  
 particles, if so be that this acrimony

cannot be overcome by Nature, or by Medicines, there is a depositum made of it in some part, where the sharp and corrosive Humours do not fail to gnaw the Flesh, cauterise the Vessels, and even to rot the very Bones, as we have seen in many Examples.

I say the same thing of Poysons that do not work but by their acrimony, of which some are acid, and others abound with lixivial salt, but always they produce the same effect, as we daily see it happen by the application of Acids and Potential Causteries.

After the Explication of the Causes, we must pass to the signs and differences of a Gangrene; as for the differences it's easie to draw them from their Causes, I pass to the signs which are of more importance.

*Signs of  
a Gangrene  
from  
want of  
Spirits,  
&c.*

The signs of a Gangrene which attack old People, and which comes from the want of Spirits, are known by that they feel neither pain, nor have Inflammation; the parts fade away, and are (as it were) deprived of sense and motion, which makes them die insensibly.

In

Chap. 35. *Of the Gangrene, &c.* 273.

In a Gangrene which succeeds the *Signs for*  
 Dropsie, there is but a slight pain in *the Drop-*  
 the beginning, but afterwards the *fie.*  
 Legs inflame, and the pain aug-  
 ments.

If it be caused from External Cold *Signs*  
 the pain is presently sharp, the part *from*  
 grows red, livid, and then black; *Cold.*  
 at last the spirits forsake it, and mor-  
 tification seizeth, accompanied with  
 a shivering like that in an Ague.

If the Gangrene be the conse- *Signs*  
 quence of some compression, as of *from Com-*  
 too narrow Ligatures, Tumours, *pression,*  
 Luxation, Fractures, or of too long *Tumours,*  
 lying on the Back, it's known by *Luxati-*  
 the benumbing, or by a total priva- *on, &c.*  
 tion of feeling and motion, accord-  
 ing as the compression is more or  
 less strong.

If it be caused by Inflammation, *Signs*  
 the pain and pulsation ceaseth, the *from In-*  
 part which was red groweth pale *flamma-*  
 and livid, there are some little Blisters *tion, &c.*  
 form'd upon the surface of the Skin,  
 fill'd with salt Water like muddy  
 Wine, the heat is extinguished, the  
 part groweth soft and withers, so that  
 being pressed with the Fingers the  
 dent remains; Finally, if the Mor-

tification be perfect, the Patient falls into great weaknesse, accompanied with a burning malignant Fever, with Vomiting, and several other symptomes, which shew, that the Mass of Blood is very much oppressed, and Death must needs follow upon it.

*Signs  
from Re-  
percus-  
sives, &c.*

The Gangrene which is produced by the use of Repercussives and Emplastic Remedies, is accompanied with the same accidents.

*Signs  
from  
Caustic  
Medi-  
cines.*

The Signs of that which comes from the use of actual Cauterics and Caustick Remedies, are almost always the same as in that which proceeds from too strong Compressions.

*Signs  
from Ma-  
lignity.*

As for the Gangrene which comes from any Malignity, as from the Bite of a Venemous Animal, besides the signs of mortification which appear upon the part, several others manifest themselves, as Carbuncle, Fever, Vomiting, Syncope, and Phrensie.

*Signs of  
a Spha-  
cel.*

The Signs of the Sphacel do not differ from those of the Gangrene, but *Secundum Majus* and *Minus*; A Sphacelated part is heavy, black, stinking,

stinking, and withered; feeling is quite lost, and the Skin is easily separated from the subjacent Flesh, finally, from being soft as it was before, when it was Gangrenated, it dryeth up when it is entirely mortified. You must observe, that if the motion sometime remain in a sphacelated part, as in the Foot, &c. it proceeds from that the Bellies of the Muscles which are not interested, making their contraction, the Tendons in the mortified part are obliged to follow their motions. I pass to the Explication of the chiefest Accidents.

The Blisters that come upon the Skin, proceed from the Blood lying Cause of the Blisters. caking and curdling in its parts, there separating from it a sharp and corrosive serosity, which insinuates it self under the Skin, separates the Cuticle, and raiseth it almost like as in Scalds.

The pulsation ceaseth in the part, Cause of and its colour grows pale and livid. the Blackness. I have shewed that the pulsation ceased by the compression of the Vessels; It's probable that the red colour disappears for want of new

Blood, and that which lyeth caking  
rots in the part, giving a violent or  
black colour according to the degree  
of Corruption and Mortification.

*Cause of  
the Pains.*

The pains proceed from the irri-  
tation and great impressiō which  
the sharp and malign serosity makes  
upōn the Membranes, and on the  
Nervous Fibres which are dispersed  
in the parts.

The Pains cease, because the Ex-  
travasated Matter lies heavy upon  
the Nerves, as well as upon the San-  
guiferous Vessels, and stop entirely  
the passage of the Spirits; we also  
observe, that the pain gives soon o-  
ver after the pulsation. Some mo-  
dern Authors pretend it to be enough,  
that the motion of the Blood being  
hinder'd in a part, to abolish the  
sensation, and motion, without the  
Nerves being compress'd; to prove  
it, they tie the descending *Aorta*,  
and they observe the inferior parts de-  
prived of sense and motion; but they  
do not consider, that these parts be-  
ing no more irrigated nor stretched  
by the Arterial Blood, they must  
needs sink and dry up, and the  
Nerves, whose substance is very soft,  
must

must be pressed; from whence I conclude, that in all kinds of Gangrene where the feeling is entirely lost, the Nerves do always suffer some compression.

The softness of the part proceeds from the abundance of serosities that water the Fibres, but also being no more vivified by the Blood and Spirits, they relax, and loose entirely their spring or Elastic Vertue.

The progress of the Gangrene comes sometimes from the Blood, which ceaseth to vivifie the parts, as in old People; but for the most part it comes from the Action of the acid Juices, which gnaw and successively destroy the neighbouring parts: It's doubtless this malignant Matter which causeth the Fever, Syncope, and the other Accidents which are ordinarily before Death. Thus having spoken of the Causes, Signs, and Accidents of the Gangrene, I come to its Prognostics and Cure.

A Gangrene which attacks old People, and Hydropic's, for want of Natural heat, is always mortal: In this kind of Gangrene, where the Spirits have forsaken their subject, we must

must not undertake the Operation, because the Patient would infallibly succumb under the violence of the pain.

That which possesses the soft and tender parts, especially the internal, is very dangerous, and degenerates very often into a Sphacel. It's also sooner cured in young than old, in strong Bodies than in Cachochymic.

*Cure of a  
Gangrene  
from  
Cold.*

The Gangrene which is caused by Cold, and which ordinarily possesses the Extremities, may be cured, provided the part be not entirely mortified, you bring the Patient near a moderate Fire, chafe the part, or steep it in luke-warm Water, and when the great Cold diminishes, and the Spirits begin to spread themselves upon the surface, you apply Fomentations & *Similia*. That which follows great Inflammations, Tumours, Fractures, Luxations, Contusions, Aneurisms, Erisipelas, Ulcers, Scalds, Scorbutick Spots, Venomous Bites, after application of too Emplastic Medicines, Caustics and Actual Cauteries, and generally upon all strong Compression, may be cured in the beginning; which makes us

con-

consider these kinds of Gangrene in two different states, as that of their Birth, and that of their Perfection. In the first, good Remedies capable of smothering and stopping this Disease, as deep Scarifications, which disengage not only the part, but also give occasion for the Medicines to penetrate and produce a more sensible effect. If in spite of all this care the Gangrene should increase, and incroach on the neighbouring parts, lay aside the use of Medicines, and proceed to Amputation of the Member, that the Mortification may not be communicated to the whole Body.

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## C H A P. XXXVI.

## Of Amputation.

*When the  
Operati-  
on is not  
to be at-  
tempted.*

**Y**OU must observe first of all, that though a part be Mortified, and Amputation the only help to save a Man's Life, yet you must not always declare for the Operation; for Example, when the Mortification possesses the superior part of the Arm, or Thigh; it would be a profaning it to undertake it, (being too near parts so necessary for Life) without causing the ruine of the whole Subject. If it only possess the Extremities, and an acute Fever, Syncope and Vomiting (which are Mortal Symptoms) accompany it, and the natural disposition of the Humours be entirely perverted and depraved, the Operation would prove very dangerous and hazardous.

Every one knows that this Operation is practised in great shatterings of the Bones, in old Ulcers and Fistula's of the Joynts; but it's first necessary to examine the Nature of the Wound;

Wound ; For Example, if the Bone be quite broke to pieces, if the Splints be engaged, and (as it were) forced down into the Flesh, or among the Tendons ; if they prick some Nerves or Sanguiferous Vessels, so that they cannot be restor'd to their natural position, it would be necessary to try the Operation ; but if the accident be not too great, and the pieces can be brought level again with the Bone, be no way alter'd, nor have caused any Inflammation, or pain ; one might hope for its cure by Medicines, unless some Joynt be concerned. In a word, I say that all compound Wounds are of difficult cure, how inconsiderable soever the complication be, especially there being any indisposition in the subject. In this occasion the Pain and Inflammation, the two Accidents most to be feared, particularly when they continue, and produce some more troublesome, and when the Accidents are pressing, it's dangerous to delay, and very often the Operation it self is not able to overcome them.

As

As for old Rottenness and Fistula's you must observe the same Circumstances, and have regard unto three things, to the Nature and Cause of the Disease, to the Part affected, and to the Supervening Symptomes.

To judge whether the Fistula's, &c. are curable, and may be overcome by Medicines, it's necessary to examine whether they have been of long continuance, the cause that produced them, and that which foment them.

If the Cause of the Rottenness and Fistula's proceed from some Wound or Contusion, and the Patient have not been long troubled with it, if the Joynt be no way alter'd, and the Humours which foment them be not malign, Medicines may terminate the Cure. But if the Cause proceed from Seropulous Humours, Critical Imposthumations, or from the general perversion of the Humours, if they be old, settled in the Joynts; and finally, if the Rottenness, Callosity, Pain, and Inflammation be considerable; In a word, if the part be no longer able to perform it's functions, you must have recourse to the  
Ope-

Operation, provided the strength of the Patient give leave; but before you put it in practice, you must purify the Mass of Blood and Humours by general Remedies, as Diaphoretic's, and Cardiac's.

I will not give you here an account of the Medicines which are employed as well Internally as Externally, to hinder the disorder of the Gangrene, being obliged to speak of them in a Treatise of Wounds, and as every kind of Gangrene requires particular and different Medicines, so it's the part of a prudent Chyrurgeon and Physician to order and use them according to their Idea's and Understandings.

Before you go about the OPERATION, you must observe several *Several Circumstances to be observed.* If it be the Arm you cut off, you must cut off as little of it as possible, because the little that remains serves in a manner to the functions of Life: If it be the Leg, though only the Foot should be concern'd, you must Amputate 3 Fingers below the Knee, just under the *Aponeuroses* which cover the *Rotula*, because of the long suppurations which

which rot the Tendons, and other accidents that may happen ; and to put on an Artificial one more easily.

*Never  
Amputate in  
the  
Joynt.*

You must never amputate in the Joynts, unless it be in the Fingers or Toes, which we are obliged to take off. If it be the Thigh, amputate as little as you can, because the more you cut the greater is the Wound, suppuration longer, and the cure more difficult, and consequently the Patient's strength diminishes, and grows more weak.

*How to  
Amputate.*

Having chosen a proper place, we perform the Operation thus. If it be the Leg, you place the Patient on the edge of a Bed, lying half backwards, one sustains him behind, a Servant clasps his two Hands about the inferior part of the Thigh, and draws the Skin upwards, another holds the Leg, whilst the Surgeon puts on the Ham a Compress of several folds, of a fitting bigness, with another pretty large Compress, which encompasses the whole part, upon which you place a Ligature, which must be streightned with the Torniket ; but being it must be tied very hard, sufficient to compress the great

great Vessels, you may place a Past-board under the Ligature, that the Patient may feel less pain, and for hindring the Skin from wrinkling ; Then you make two other Ligatures, one over, and the other below ; the first keeps the Skin which you raise upward, and the other fastens the Flesh ; Then the Surgeon places himself between the Patients Legs, and with a crooked Knife which he holds in his Right Hand, he makes an Incision about the Member even to the Bone, and with the Back of the Knife separates the *Periostium*, and cuts at the same time the Flesh and Membranes between the Bones, lest you rend them with the Saw, and so cause new accidents ; but before you saw the Bones, you take a Fillet of Linnen which you split in two parts, and you make use of it to raise the Flesh, and to give liberty to saw the Bone as near to the Flesh as possible ; for seeing it wastes and consumes in suppuration, if this precaution were not taken, there would stick out an end of the Bone deprived of Skin and Flesh, which would serve for nothing but to incommode the Patient. This

*How to  
saw the  
Bone.*

This being done, you take the Saw, which you carry obliquely over the *Tibia*, which also serves for a support to saw the *Fibula*, which is the weaker; which obliges us to saw it before the *Tibia*, to avoid its cracking or shivering.

*How to  
tye the  
Artery.*

You must observe, that in the time of sawing, the Servant must bend the Leg a little inward, that the Saw may pass more easily. The two Bones being sawed off, you take off the Ligature above, which held the Skin fast, you loose the Torniket; to find out the Artery, you take hold of it with the Crow's Bill, or Pincers with a Ring, then you take a crooked Needle arm'd with Wax'd Thread, which you pass twice into the Flesh under the Artery, that it may be engaged in the Loop of the Ligature, which you tie very hard; you make a knot over the Artery, upon the knot you apply a little compress, which you fasten with two other knots, you again loose the Torniket; If the Blood should run out with any violence from any other Artery, you make another Ligature as the first.

Some

Some to stop the Blood use an Actual Cautery, others a Button of Vitriol, which they wrap up in some Cotton; some tie the Artery without passing the Ligature through the Flesh: But I think the true and surest Method to be as I have describ'd. The Ligature being made, you take away the Turnstick from off the Stump, and endeavour to cover it again with the *Cutis*; If it be Thigh or Arm, it's not enough to cover the Stump again with the *Cutis*, but you must keep it so by the help of four Stitches, which must not be practis'd at the Leg, or below the Elbow; because the Knee or Elbow hinder it from rising too high, you apply little compresses upon the Vessels, and a dry one on the Bone, or soaked in Spirit of Wine to correct its alteration, then several other Boulders arm'd with Astringent Powders, over that a little Tow spread with the same Powders, a Defensative and Compress like a *Malta* Cross, two Longitudinal Compresses, and a Circular one, sustain'd by the Circular Bandage and Capling; some days after you use only the Circular one,

you

Where to  
use the  
Stitches,  
how to  
dress the  
Stump.

+

*A Hogs  
Bladder  
of no  
great use.*

you need not load the part with too many Compresses, nor apply the Hogs Bladder, neither tye the Bandage too hard; for besides that all these things excite only Obstructions and Inflammations, & if by chance the Ligatures should fail, the Patient would infallibly perish unawares, because the Bladder could retain all the Blood that should run out. You must take care in pulling off the Dressings, not to handle them with too much violence, lest you pull also off the Ligature. You must take care after suppuration to press the Stump a little by means of the Compress, to hinder the generation of fungous and superfluous Flesh, which ordinarily happens after long Suppurations.

*Caution  
to be used  
in apply-  
ing the  
Vitreal  
Button.*

Those that use the Vitriol Button must precisely apply it to the mouths of the Vessels, and take care it doth not fall in applying the Bolsters. Nevertheless though we have disapproved its use for several Reasons; yet those that will make use of it ought to lift the Stump up a little, and hold the Hand upon it for 3 or 4 hours, until the Vitriol hath begun to produce its effect. It

It happens sometimes, that after the Operation the part suffers some Convulsive Motions, occasioned by the Spirits being irritated by sharp, corrosive, or Vitriolic Matters, or by the trouble of the Spirits themselves in the part. For if we consider that the Brain actually prepares a certain quantity of Spirits, which run through the Nerves, to serve the Functions of the whole Body, we shall agree, that those which are designed for the motions and sensation of that part which is no more existent, but separated from the others, must needs run back; It's perhaps this unlucky reflux which excites these irregular Convulsions, and the involuntary Contractions pull along with them the Arteries, and so gives occasion to the Ligature to break, and the part to bleed, which often causeth Death. Therefore in these Occasions a Chyrurgeon must not stand searching for the Artery, he must only lay upon it the Vitriolic Button, with Bolsters soaked in some Styptic Liquor. These are the measures which you must take in such Occasions.

## C H A P. XXXVII.

## • Of Paronychia.

**P**ARONYCHIA is a very painful Tumour which possesseth the Fingers ends, caused by the alteration and effervescency of the Bilious and Sulphureous Particles of the Blood.

*Two kinds  
of Paro-  
nychia.*

They ordinarily make two kinds of it; in the one the Matter lies between the Periostium and the Bone, accompanied with a burning heat, acute pain, and deep pulsation, great Tention, and burning Fever; The other is only in the Flesh, with less heat, and pain, lighter pulsation, less Tention, and hardly any Fever at all.

*Cause of  
the Heat  
and Pain.*

The heat and pain come from the strong ebullition of the Blood, and many irritations which the sulphureous particles (that ~~is~~ <sup>are</sup> turn'd into Sanies) excite at the Fibres of the *Periostium*.

The

Ch. 37. Of Paronychia. 291

The Tention proceeds only from *Cause of the Tention.*  
the fermentation of the Humours, it's easie to comprehend that when a Liquor boils, it extends it self more in length and breadth than when it is at rest, and must consequently dilate the Vessels (in a great manner) that contain it.

The Pulsation is nothing else but *Cause of the Pulsation.*  
a more exquisite and lively feeling that we have of the Arteries beating in the inflamed part, caused by a great Tention and Effervescency of the Blood.

The Fever comes from the mutual *Cause of the Fever.*  
agitation of the different particles of the Blood, that fight against one another with great strength, and tear one another in a thousand little particles of a different bigness and figure, which being moved in the mass of Blood excites the Fever, but after a long struggle the Pus is made, the Vessels burst, the Matter Extravasates, the Tumour grows softer, the Fever and all other symptomes diminish, then we give the Pus Issue, by Incision, which we make at the side of *Where to make the Incision.*  
the Finger to avoid the Tendon, we then use those Medicines ordinarily used for other Ulcers. I

I will no longer insist upon the *Paronychia*, though it would furnish us with Matter for a long Discourse, and seeing most Authors have given their Opinion of it, any one may be Instructed by them.

## C H A P. XXXVIII.

### *Of the Use of Cupping-Glasses.*

*Cupping-  
Glasses of  
very little  
use.*

**M**OST Practitioners of Physick are wont rather to approve the use of Cupping-Glasses and Leeches, than condemn it, be it, that they either found themselves upon that pretended Attraction of the Ancients, or that they think to discharge sooner a part loaden with the weight of some strange Matter: It's true, they use them but with little success; besides this Attraction is just a Chimera, and is the most cruel and temerarious practice that can be imagined; What appearance is there to scarrifie the Back, to dissipate Inflammation of the Eyes? To slash the Loyns to hinder the progress of malign

lign Fevers; to cut the Skin and <sup>No such</sup> Flesh in 20 different places, to draw <sup>thing as</sup> one or two Ounces of Blood? I do <sup>Attraction.</sup> not believe that those who have an Idea of the Circulation of the Blood, can shew me by Experience, or any other way, that the division of some Cupillary Vessels are capable of curing the least Cutaneous affect. Nevertheless there are some that do authorize this practice, maintain, that the Scarifications do determine the Blood and Spirits to repair in abundance to the scarified parts, and that in moving the Humours after this manner, the afflicted part is disengaged, and the Inflammation less'n'd.

It's to be wished for the Partisans of this practice, that the Inflammation would favour their Opinion. For we cannot believe that the Blood and Spirits running into a part in a greater quantity than they used to do, without causing some Inflammation, which is not observed here; besides, that the Inflammation comes <sup>Inflammation</sup> not, but because the motion of the <sup>caused</sup> Blood is intercepted by the divulsions of the Vessels, as it happens in <sup>only by the</sup> <sup>interrup-</sup> <sup>tion of the</sup> all Blood.

all new Wounds, and not at all by a determination occasion'd by the Pains.

Lastly, all the Vertues which are attributed to Cupping-Glasses, shall not hinder me from disapproving their use; for I say, that they are not only useless in many Diseases where they are employed, but also in Venereal Sores, and Bites of Venomous Animals, since it's certain, that the Poyson of these Animals, which consists in a strange acid, manifests it self in a moment to the Brain, in spite of the influence of the Spirits, and that the Mass of Blood is presently oppress'd with it, by the Laws of Circulation; from whence I conclude, that once Bleeding, or the least Sudorific in what Disease soever, will always do more good than all the Cupping-Glasses you can apply.

*Leeches  
very of-  
ten the  
cause of  
Fistula's.*

You must observe, that in the *Hemorrhoides*, Emollient and Discharging Remedies are to be preferr'd before Leeches, which are very often the cause of Imposthumes, and Fistula's in the *Anus*, as I have shewed you in the Treatise of Fistula's.

I also say by the bye, that Caustic's are not applied upon Nervous parts, nor upon the great Vessels, but always between the Muscles. *Where and how to make an Issue by Caustic.* You first rub the part with a warm Cloth, to open the Pores, and to make the part in a manner insensible; you put a Plaister on it with a hole in the middle, to put the Caustic in, which you cover with a Compress, and with a little Fillet.

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A  
GENERAL IDEA  
OF  
WOUNDS.

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## C H A P. I.

*Of Incised or Contused Wounds of  
the Flesh.*

**T**O finish this Treatise I thought fit to relate the most Important Observations which regard the Cure of Wounds, and to clear the stiffest difficulties which puzzle most Chyrurgeons, in the Method of discussing them well, without which we cannot obtain our wish'd for end.

Those

Those that hitherto have treated of them, have been satisfied to hold long Discourses about their several Kinds, Differences, and Prognostics, but seeing these sorts of useless Discourses serve only to tire the memory of those which seek to be Instructed, I will not repeat them; I begin first with the most simple and known Symptoms.

Being the Hemorrhage is the first *To stop the* and most dangerous Symptome of *Hemor-* Wounds, it's that which the Surgeon *rhage in* must quickly correct, in closing the *Wounds.* Vessels from whence the Blood flows. For if you stop them the Blood runs no more, that is to say, you must put into their Apertures some Medicines which hinders the effusion of the Liquors they contain, or in tying or compressing them. These two last Methods are the surest, because one may order them as one please, so that the Intention for which we make the Ligature, or introduce Lint into a new Wound, is to hinder the flux of Blood, in pressing the Lint a little to oblige the sides of the Vessels to approach, and resist the Impulsion of the Blood, yet so that the Compress-

sion excite not Inflammation. A Wound having been so dressed, it's of importance to prevent the Inflammation and Pain, which are the two accidents which always accompany it.

*Cause of  
Inflam-  
mation.*

The Inflammation or Tumour proceeds from the Circulation in the part being impeded, by the division of the Vessels, the Grumous cloded Blood, and the Dressings. These strange Bodies are as so many Sluces which oppose the course of the Blood, obliging it to stop and excite Inflammation.

*Cause of  
Pulsative  
pain.*

I conceive two sorts of Pain. The first is a Pulsative pain, which depends on the Arteries, that creep about the Nerves, which at that time are so extended, that they strike the Nerves more rudely than they used to do, and make them suffer so great distentions, that they break, and it's this plurality of divisions which cause the Pain.

*Cause of  
the quick  
and burn-  
ing pain.*

The second is a quick and burning Pain, caused by the suppression of the course of the Blood, which by the motion and frequent shocks of its most active principles, bursts the Vef-

vessels, and extravasateth between the porosities of the Flesh, where it's rarified by the great quantity of concentrated Spirits, which penetrate the most insensible Porosities. Then doth the Blood by its irregular action shake, and violently prick the little Nervous Fillaments, from whence proceeds this second kind of burning pain.

We commonly prevent these two 2.  
 Accidents, by repressing the motions To prevent  
 of the Blood, which comes to the pain.  
 part with too great precipitation, by Repercussives and gentle Astringents. Bandages are of the first rank, which we use very successfully in binding the Wound up gently, as also the neighbouring parts; whereas too tight a compression would augment the Inflammation. It's for this end we readily employ Defensatives, as we call them, because they are compounded of a Desiccative Matter, which insensibly shuts up the porosities of the Vessels, as *Terra Sigillata* & *Bole* mixt with the White of an Egg, or common Water.

*Caution.*

You must observe never to leave them longer on then 24 hours, for Reasons which we shall alledge hereafter. You must at the same time sweeten the acrimony of the Blood, and empty the Vessels by Phlebotomy, Clysters, and a good Diet.

*A thin  
Diet ex-  
ceeding  
good in  
Wounds.*

If the patient would be prudent in his way of living, and use only a thin spare Diet, he would suffer much less pain, and his cure would be quicker, because Salt Meat is capable of thickning the Blood; and making it fit for fermentation, whereas sweet Liquids, by their insipidness dissolve and charge themselves with the salt, and precipitate it by Urine; after this manner the intemperies of the Blood is corrected, and the affected part relieved.

*Benefit of  
Clysters.*

Clysters are also of great use, because they hinder the Excrements from heating, and boiling back again in the Intestines, they dilate the Matter, moderate the heat of all the Viscera, and contribute much to the cure of Wounds.

*Repercus-  
sives used  
only in the  
first Dres-  
sing.*

You must observe, that at the same time Repercussives retain the most subtil and agitated salt particles of the Blood,

Blood, they grow fowr, gnaw the Vessels, and excite a fermentation, upon which a Fever soon follows; They are therefore only used in the first Dressing, and prefer Discutients which open the Pores, and causes the volatile salts to perspire, and so empty the part. It's easie to see, if one continues the use of Repercussives, the salts endeavouring to escape, fail not to excite Inflammation, and to corrupt the nourishing Juice of the parts, in disuniting the principles of the Blood, which depend one on another, & which by the frequent encounter, and shock of their particles, change figure; from which depends the generation of a new Matter, and all the changes which happen. If *Discutients and Suppurations must work together.* in such an occasion Discutients which causes perspiration, and Digestives, which excites a quick suppuration, should not work together to disengage the part, it would tumisie so much as to fall into Gangrene. Cataplasms, which have Oyls and Fats in their composition, have almost the same effect as Repercussives, for which Reason good Practitioners disapprove their use.

We observe, that in great Wounds Discutients excite often a fermentation which increases the Inflammation : In that Case, a Cataplasme made with Crums of Bread, Milk, the Yolk of an Egg, Mallow Roots, &c. is very proper. We ordinarily blame those who let the Pus lie too long in the Wound ; because it always gets some malignity, & corrodes the neighbouring Vessels, which presently produces Inflammation & Putrefaction ; or else the Veins absorb it, & carry it to the Heart, from whence it diffuseth it self into the whole Mass of Blood, and causes the Fever ; and according to the different alterations which it receives in passing through the parts, it obstructs the Liver, Lungs, or some other part, so causes an Imposthume there, as we have observed in Wounds of the Head. This demonstrates to us, that we ought to dry up all the Matter that is in the Wound, and press the Dressels into the least corner, that the Matter may not lurk there. It's so true, that the Mass of Blood takes up the purulent Matter in the time of its stay there, that whenever you Bleed the Patient, you often find some Pus mixt with his Blood. If

*Matter  
often seen  
mixt  
with the  
Blood.*

If the Lips of the Wound grow callous, you must betake your self to general Remedies, which sweetens the acrimony of the Blood, or Topics which digest and ripen the Matter, as *Emplaf. Andreas e cruce*, which makes the edges of the Wound tender, also Digestives of Turpentine, *Spirit. Vini*, *Ol. ovor.* & *Pul. Aristolochia*. If all this be not enough to waste the Callosity, you slightly scarifie the Lips of the Wound, to give way to the Remedies to penetrate and excite suppuration.

If the part disengages it self by a copious suppuration, you prefer Compresses soaked in warm Wine before Cataplasms, because it fortifies the part.

It's observed, that after long suppurations, there always grows proud Flesh, which is sometimes taken away by compressing the Wound a little; if this pressure be not enough, we use *Pul. Sabinae* mixt with Hony, or pass over it the Coustic Stone, or use *Pul. Alum. Vet.* after it's consumed, we stop its generation with the *Aq. Rhagadonica*, which dryeth and shuts up the Extremities of the Vessels, which

which had been before relaxed by the Suppuratives, which had given room to the nourishing Juice by its overabundance to beget this fungous Flesh.

The Method is often changed according to the disposition of the Wounded Subjects ; for Example, elderly People, or those that are lean and spare, have ordinarily their parts soft and loose, because a part of their heat is extinguished ; in this case the Phagedenic Water would be hurtful, because in shutting the Pores too much, and not permitting their little heat to open them, the Wound would entirely dry up, Detersive and Traumatic Medicines ordinarily supply its default, because they contain alkaline particles ; which destroy the acid of the Blood by insensibly opening the little mouths of the Vessels, and charge themselves with the Suppurative particles, which being united with them stick at their Extremities, to regenerate new Flesh ; such is the Spirit or Decoct. of these Vulnerary Plants, as *Rad. Aristoloc. O. & Long. Fol. Vinæ Pervinc. Scord. Ab-sinth. Fol. & Rad. Angelic. Consolid. Pyrolæ,*

Some  
choice  
Trauma-  
tic  
Plants.

*Pyrolæ, Scrophulariæ, Sanicula, Persicaria*, and many others. These Symples are charg'd with alkaline particles, which absorb the predominant acid, hinders the rise of the Fever, and makes the Wound of a Vermilion hue.

We observe according to the degree of Corruption, that when the Suppurative particles cannot accommodate themselves to the Extremities of the Vessels without the help of some medium, we mix with the Traumatic Decoctions some things that have a kind of unctiosity in them, as *Mel Rosat.* which is admirable, especially when the Pus is thin and fluid, whereas if it be thick we lessen its quantity. If it be black and serous, it's a sign that it is in the last degree of corruption. As in this alteration of the Blood where Trau-  
matics cannot master the Acids, we use successfully a Spirit drawn from brown Sugar, *Vitriol Mart. & Hep. Antim.* which resists all sorts of Cor-  
ruptions.

*An Extraordinary Spirit for Wounds.*

This Spirit is charged with Balsamic, Styptic, and Alkaline sulphureous salt particles; The Balsamie par-

particles supple the Vessels by their unctiosity, the Styptic fortifie them by their Astringency, and the Alkalist salts blunt and master the sharpest Acids by their porosity. I think this method of dressing is to be preferr'd before that where they use greasy Unguents, Plaisters, and Balms without intermission.

*Signs of  
good Pus.*

That the *Pus* be right, it must be of a moderate consistence, white and without any ill smell. It often happens, that when we intend to destroy its acidity, there riseth a soft fungous Flesh, which depends on the great fermentation of the Acids and Alkalies, and when that fermentation ceases, that faint Flesh is dissipated only by compression. Most Practitioners, without any reflection, presently use burnt Alom, and if it work not fast enough, they use red precipitate, and if that performs no more than the other, they make a mixture of them, which may well be call'd the Diabolical Corrosive; it increaseth the Pain, and renews the Inflammation; But to avoid the Impression of such a strong Corrosive, you take the Traumatic Decoction, in which  
you

you dissolve a Drachm or two of Calcin'd Vitriol, so you consume insensibly the Flesh.

It's observed, that the Flesh often grows hard, especially when the part is too much loaded, or the Bandage too strait, the motion of the Juices being intercepted, which must be avoided in all sorts of Wounds; If the Flesh be red, and granulate well, you must not press it, you introduce only into the Wound a pledgit of Lint wet in warm Wine or Brandy.

You must never wash Wounds, it's enough to dry them with Lint; If you are obliged to siringe them, you must do it discreetly, because the Injection melts and dissolves the Flesh, *How to Siringe Wounds.* so that instead of breeding good, it produces Fungous; in this case Lint only soaked in warm Wine sufficeth, because it cleanses the Wound in drinking up the Impurities it finds there, unless there be some Sinuses, which cannot be opened by reason of the Vessels, Tendons, or thickness of the substance which we must be obliged to offend in making the Incision; then we use Injections when we cannot introduce Lint in the bottom of the Sinuses. We

We always observe in Wounds certain white and hard places, which are nothing else but some broken Lymphatic Vessels, and which most Practitioners take for the beginning of a Cicatrix; in that case Lime-water is useful to dry up the Extremity of the Vessels, and dissipate the Glutinous particles of the *Lympha*, which produces some Fungus's to grow over the Vessels.

It's very important to distinguish this white mark from the extremity of the cut Nerve, for if one should put on a Nerve any corrosive Medicine, it would excite an insupportable pain, which it doth not here; besides Experience Authorises it, as often as we carry off a Gland, and Lymphatic Vessel of a Veneral Bubo; there appears next morning a round and hard point, which cannot be consumed without *Pul. Vitreol. Rub.* all other as *Precep.* and Allom burnt, &c. work in vain. But that which is most surprising, is, that this Corrosive Powder which in 1000 occasions is insupportable, is not felt at all in this.

You

You must observe, that if some Lymphatic Vessel open in the bottom of a Wound, and spils the Lympha there, it fails not to turn Fistulous; this for the most part happens unforeseen; in which case to cure the Fistula, you must open even to the Gland if possible, to destroy it, and drain the source of it. If you fear you should not succeed this way, you must hinder the Vessel from shedding the Lympha into the bottom of the Wound by drying up its extremity, and procure the generation of Flesh as fast as you can.

If a Wound be accompanied with contusion, you must use the strongest Discutients, as *Spirit. Vini* alone, or *Aromatised*, or a *Lixivium*, which shall be described in the Chapter of Wounds made with Fire-Arms.

If the Matter discufs not, and that it increaseth, you must disengage the parts by Scarification, and use Medicines which awaken the particles of the Blood that are at rest; and force them out by perspiration, or to re-enter again in commerce with the Liquors. This is the method which you must follow in great Inflammations.

ons where the Gangrene is apt to succeed.

The Medicines are the Decoction of the chiefest Vulneraries which we have recommended afore ; The Tinctures of Aloes, Olibanum Myrrh made with the Spirit of Wine, all Medicines where the preparations of Mercury enter, Urine, Sea Water, Cataplasms made with Meal of Lupins, Beans and Lentiles, Tops of Wormwood, and Scordium boiled in Oximel Simp. These are the chiefest Remedies which are to be employed in deep Scarifications ; some destroy and blunt the Acids, some sweeten and correct the Acrimony of the Lixivial salts, others strengthen the part, and all together contribute to retain the spirituous particles which are ready to escape, or to disengage them when concentrated, and produce a fermentation which separates the Morbid Leavens, and restores the heat and spirits again into the part.

If a great flux of Blood follow upon the Wound, or if any considerable Vessel be opened, you must make the Ligature if the place permit,

mit, or use the Vitriolic Button, or some Styptic Water, as that in Mr. *Le-mery's* Chymistry, and some drops of Spirit of Turpentine.

If the Orifice of the Wound permit not the entry of your Dossels, *When to dilate the Wound.* you must dilate it, avoiding the great Vessels and Tendons. This is the surest and most important practice to succeed in all Wounds, where one cannot apply Boulsters, because in discovering the bottom of the Wound you have the advantage to use Boulsters, and reject the use of Tents, which are only Beneficial in deep Wounds of the Thorax and Belly; you may also better wipe the lesser corners of the Wound, fill it with Dossels, and hinder the Matter from cakeing or lodging it self in any corner, and to hinder the formation of any *Sinus*. I have made you observe, that many Compresses, and too narrow Bandages, are kinds of Ligature which stop the course of the Blood, and which increase the fluxion, and all other accidents.

A Wound ought to be dressed as soon as possible, to secure it from the Appulse of the Air, and free the  
Pa-

*It's of  
great Be-  
nefit to  
Cleanse  
the Cir-  
cumfe-  
rence of  
Wounds.*

Patient from some Pain. You must also take care to cleanse well its Circumference, which is a very important Circumstance, because the Cataplasms and Emplasters which are applied upon it, stick to the Skin, and form a kind of Scab which hinders the effect of the Remedies, and retain those particles of the Blood which would transpire, whereas if you free the Skin from this Scabbard, the Remedies presently enter through the Pores, as soon as they feel the heat, they favour the transpiration, the part empties it self, the accidents diminish, and the Wound unites more easily. You must observe, that Emplasters compounded of Fats, Gums, and Powders, serve only to retain the Dressings, and to oppose the Exaltation of the Juices. For which reason good Practitioners condemn them.

*How to  
Cicatrise  
Wounds.*

In the time when the Wound begins to cicatrise, and the Flesh groweth unequally, we let it increase till all Inequalities are fill'd; then we dry them with Lime-water, or some other Difficative Medicine, to cause an even Cicatrice. If the Flesh arise.

arise too high, you pass gently the Infernal Stone over it.

To this Method of dressing a Wound, I will yet add, that the situation must favour the Circulation of the Humours, and the running out of the Matter. These are the chiefest Circumstances which must be observed in dressing Wounds in the Fleshy parts, where the Inflammation, Aperture of any great Vessel, great loss of substance, and the Confusion doth not permit us to practice the Sutures.

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## C H A P. II

*Of Punctured Wounds, or those made with a small and sharp-pointed Instrument.*

**W**OUNDS that pass through are not so dangerous as those which have but one Aperture; they are sometimes cured by the help of Bandage applied outwardly with some Boulsters soaked in Spirit of Wine.

*Signs  
when to  
dilate the  
Wound.*

If one be pain'd, and the part inflamed, it's an evident sign that there are some Obstructions, Extraneous Bodies, which hinder the union. These two Accidents do also signify the necessity that there is to dilate it, for to carry Remedies to the part, and give a greater vent to the Matter, we most commonly introduce two Tents of Lint of a length and thickness proportionable to the Orifices, we fasten Threads to them, and dip them in some Digestive made of Ol. Ovor. Spirit Vini, and

and Turpentine, which we alter according to the different degrees of Inflammation ; if the Suppuration be plentiful, the Spirit of Wine must predominate ; if suppressed by the Inflammation, we must correct the Spirit of Wine, by putting to it more Turpentine.

If the ~~Pur~~ be good, and the most intimate parts re-unite themselves, you must continue this Method ; but if it be black, and Inflammation succeed, Phlebotomy, reiterated Clysters, and cooling and opening Fisans must not be neglected, we correct the Digestives with *Ol. Rosar.* Traumatic Injections with Brandy in this occasion are admirable.

If notwithstanding these precautions the Inflammation incroaches upon the neighbouring parts, with putrefaction, you must dilate it sufficiently to discover the place where the Matter lodges ; by this means you discharge the part, and dress all the corners where the Matter formerly was nestling, and so prevent Gangrene and Mortification.

*Where  
prepared  
Sponge is  
better to  
dilate  
with  
than In-  
cision.*

Concerning the Dilatation of Wounds, there be some who pretend that the prepared Sponge may supply the want of Incision; I own, that, in places where much dilating is not wanting, and where the Cicatrices would deform, as in the Face; and am so far from condemning the use of it, that I say it's very necessary; but in all other Occasions the Incision is to be prefer'd.

Though a Wound goes not through and through, yet if the Probe enters almost through the part, you must without delay make an Incision on the opposite side.

*The Symp-  
tomes  
which  
commonly  
attend*

*Punctur'd  
Wounds.*

The most frequent Symptomes that happen in these kinds of Wounds, are Fever and Looseness, upon which sometimes follows Dysentery.

The Fever excites Inflammation, and retards Suppuration, that the part becomes so tumified, that a Gangrene often follows it. It's known that the different degrees of the Fever rule those of the Inflammation, as these do them of the Gangrene. Bleeding, Clysters, Sweet and Liquid Food, Emollient and Dis- cutient Cataplasms made of the four Meals,

Meals, Honey, and the Emollient Herbs boil'd in Wine, as *Fol. Malve, Althea, Seneslionis, Violar. Rarietaria, Candilaria, Chamomilla, Meliot. &c.* All these Medicines are very Efficacious here.

You must observe to let the Cataplasms be very moist lest they dry up; and so instead of Humecting and Mollifying the Fibres, they obstruct the Pores as Astringents, and hinder Transpiration.

If in spite of all this care the Inflammation goes not off, you relieve the part by some slight Scarifications; if they be not enough, you make others deeper, that the Medicines may have room to work.

If the Wound be superficial, you must dilate it; but if it penetrate even to the most intimate parts, I mean near the great Vessels or Bones, you must keep to Scarifications, and Injections made of Traumatic Plants, *Mel. Rosar.* and Spirit of Wine, because you would be apt to ruine the whole part by the Incision, which must afterwards be cut off.

It often happens, that the Gangrene comes on the sides of these kinds of Wounds, where the Obstruction is always most considerable, in which case your Pleagets must be well charg'd with Digestives.

If the Inflammation goes not off either by Suppuration or Transpiration, and the red colour of the Skin changes not, you must use strong Maturative Cataplasms of White Lilly Roots, Sorrel, Leaven, and the common Digestive, provided the Inflammation communicates it self not to the adjacent parts.

Scarifications are not to be used but when the part is extreemly stretched, and the red colour changed into a livid, and when little Blisters arise which signifies a beginning Mortification, and shews that the ferment of the Gangrene is very acid and malignant; you must not stay till these little Blisters increase, but as soon as you see that the Wound doth not suppurate, and the Skin changes colour, you ought to Scarifie, and lay Compresses upon the neighbouring parts, soak'd in warm Wine and Brandy.

The

The Fever is sometimes extinguished by Scarification, because the Agitated Matter of the Acid ferment hath room to escape; so the Inflammation is diminished, Suppuration procured, and the progress of Putrefaction stopped.

If the Lips of the Wound be of a Vermilion colour, it's a token that the salt particles prick the Membranes, and increase the Fluxion; it excites the Fever a-new for some time, and the edges of the Wound grow white and dry. This change proceeds from the salt Juices, which by their too great motion separate themselves from the sulphurous ones, so that they irrigate the Fibres, and cause a new Obstruction, which afterwards makes the Flesh foggy and white.

We often observe, that though the Wound be often ready to Cicatrise, yet if the Fever arises a-new, it grows bigger and more dangerous than it was before, because the Inflammation makes a greater progress, in this case you touch the new form'd Skin with *Aq. Calcis*, in which some *Mercurius Sublimat.* has been dissolved;

but without using any remedy you may cut it off, for the ferment of that Membrane infects the neighbouring parts. Balsam of Sulphur is very good in this occasion, especially in small Putrefactions.

*Flux a  
dange-  
rous  
Symp-  
tome.*

If a Flux come upon a Flesh Wound, it's a very dangerous symptome, because it only happens when the salt particles have left the part, and enter into the Mass of Liquors. Now as the Volatil salts maintain the motion of the Blood and other Humours, and have a vertue of dissolving and making them fluid, we are to search no where else the cause of this Symptome. This Flux hinders Suppuration, and weakens the Sick more than all other accidents together, because of the great dissipation of Spirits that is made by the Stools. We also observe, that the Wound dries, shrivels, and becomes as it were mortified, according as the Spirits abandon it; and the stronger the Flux is, the more the Inflammation lessens, the Flesh dries up, and the part becomes more faint, adust and putrid. You must foment it with Aromatic Wines, and hinder  
the

the difunion of the salts by the help of Balsam of Sulphur ; but from the moment that the Spirits exalt themselves towards the surface, the motion of the Blood slackens, the Flux ceaseth, and the Wound which before was inanimate as it were, revives again.

This Flux must be stopt with great Circumspection, for it's a sign that the salts are become very acid, since they offend every part where they lie ; you must always stop it by degrees, for fear a sudden suppression might again revive the Fever, and render it more malignant and pernicious, which would presently unite Putrefaction with Inflammation. The Flux being stopt, the Patient must be fed with sweet and thick Food.

The proper Medicines for stopping a Flux are Clysters made of White Broth, Mallows, Bran, Lettice, Knot-grass, and the Yolk of Eggs. Tisans made of Bugle, Sannicle, Lemons, and Liquorish, are also of great help.

We observe, that this Flux happens oftner in great Hospitals, than any where else, especially in great Wounds, because the Wounded receive there an Air loaden with Malign and Pestilential Vapours, which not only causes the Looseness, but all the other troublesome Accidents which follow upon it.

We observe, that the Wounds which happen to the Legs are most dangerous, or of difficult cure, but since the Circulation being more slow in them, their Tendons and Membranes stretched, and their Vesicles more narrow, this disposition of parts causes the Humours to settle and employ themselves more easily, and that only the serosity is able to disengage it self in time of their settlings, by its abode changes into a Virulent Sanies, which entertain the Wounds of these hard and callous parts. They also require some Medicines capable of carrying off, and melting the Callosity, and destroying the Sanies which is the chief cause of it.

When

When Wounds are of difficult cure, and as it were unconquerable with Medicines, it's the evil disposition of the Subject for the most part which contributes to it. Some are naturally of an Ill Habit, others affected with some Venereal Disease, or some other as bad; Finally, others do not govern themselves, and have a greater inclination for that which is hurtful to them, and which is capable of heating and altering their Blood; If in these kinds of Inconveniencies the Medicines which we have used produce not any effect, Cardiac's and Medicines of a Purifying Quality favours their cure; as all Aromatic's, Cordial Potions, all Preparations of Mercury and Antimony, Theriac, Confections, Powder of Vipers, with their Volatil Salt, Volatil salt of Hearts-horn, and several Medicines of the same Nature, which differently, according to the different degrees of Corruption.

*What to  
be used in  
Venomous  
Wounds.*

This is the Practice which must be followed in Venomous Wounds, having applied upon the part all things that resist Mortification.

P 4 These

These are more or less mortal according as the malignity, activity, and penetration of the Acid Humour (wherein consists the Nature of Poyson) are more or less great and fatal.

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### C H A P. III.

#### *Of Wounds of the Tendons.*

**I** Have made you observe, speaking of the Suture of the Tendons, that when it's quite cut, there happens no troublesome accident but that it retires towards its Origine, and that one is obliged to soften their Fibres with Oyls drawn without Fire, that their reunion may be the easier.

I have also made you observe, that the Stitch being made, it was necessary to Humect the Tendon with Oyl and Spirit of Wine, the Oyl resists the Impressions of the Air, and the Spirit of Wine penetrating the least Porosities, deobstructs their Channels in driving out the Humours, and by this means the course

course of Symptomes, particularly that of Pain is stop'd. Suppuratives must follow next immediately, forasmuch as they hinder that the Inflammation may not cause long suppuration, which would infallibly rot the Tendons in spite of all the care that might be taken, as it happens in all great Fluxions, where the Tendons are discovered. This is the reason which obliges us to stay till the Suppuration be accomplished, and the Tendon covered, before we use Difficatives, as *Tinct. Aloes, Spirit. Vini*, with several others, because in drying the part too soon you hinder the dissolution of the Juice, stops Suppuration, and retains the Inflammation, which is the true cause why the Tendon rots.

The Inflammation which comes upon Wounds of the Tendons that lie but shallow under the Skin, is not dangerous, but since the Juice which exudes out of it is corrosive, it awakes the Pain and all other Accidents which most commonly attend Wounds of the Tendons. But if it happen that a deep Tendon be hurt, the Inflammation and Obstructions

N 5      are

are greater, and more troublesome, by reason of the many Sanguin Vessels which lie over it.

If the Accidents continue, and the Tendon suppurates not, it's most convenient to dilate the Wound, that the Remedies may be able to penetrate, and ease the part by causing a speedy suppuration.

If the Flesh which is generated in these kinds of Wounds become callos, it's a sign that the salt abounds every where, and that the fluxions will be great, since the salt particles condense themselves in the very substance of the part. We use only here Digestives and Balsams which are convenient till the Wound be ready to cicatrise, being capable of melting and dissolving the Juices, by which we know that Difficatives are noxious because they procure too soon a Cicatrix.

There's sometimes generated a soft spongy Flesh, which threatens the part with great Obstruction; then it's also necessary to continue the Digestives; for Difficatives glue and harden too much the nourishing particles, and augment the abundance

dance of the salts which cause faulty Flesh. In this case *SCHRODER'S* Green Balm is excellent.

You must observe, that a Tendon may be hurt by a prick without any accident happening. This is when the Instrument slips between the Interval of the Fibres without endamaging them. But if by chance it divides some of the Fibres, Obstructions follow, which occasions the nourishing Juice to become corrosive, gnawing the Fibres and Membranes, which causes a greater Obstruction, & more violent Pain; Besides the Spirits which are irritated by these sharp Matters augment the Inflammation, which at first is not so considerable, but afterwards very dangerous.

To help this inconvenience, you ought without scruple to open the Teguments and Flesh to find the place of the prick'd Tendon, and to sweeten the Acrimony of the salts with *Ol. Olor. Cere*, and *Spirit. Vini*, not neglecting at the same time the use of Digestives and Balms. If the Accidents cease not, it's a sign the Puncture is deep, and that the Medicaments cannot penetrate; then  
you

you must separate dexterously the Fibres of the Tendon according to their length, to give way to the Balsamic Particles to soften the Fibres, and the Spirit of Wine to discuss the Humours, and cause a more easie Suppuration.

The Inflammation which follows upon the Puncture of a Tendon incroaches often upon the near parts; as for Example, if the Tendon of the Finger be prickt, the Wrist and Arm swell so much, that one is often obliged to Amputate it. For seeing the Tendon and Belly of the Muscle contain nothing but a heap of Fibres of the same continuity, the Convulsions and consequently the Inflammation communicates it self not only to the Belly of the Muscle, but also to all the neighbouring parts. You must not be astonished if these parts have such a correspondence together, and if they communicate so mutually one to another their alterations. If there be any difference between the Tendon and the Belly of the Muscle, it consists only in their Texture, and in the more or less Inflammation, Tention, or Pain.

The

The most Specific Remedies to stop the Accidents of a Punctured Tendon, is to give issue to the Wound. If the Tendon lie high, we use Balsamic's and Digestives ; but if deep, you must add Spirit of Wine ; if the fluxion be great, you apply upon the Tendon a little Broustet soaked in Brandy, to secure it from the impression of the Purulent Matter. As concerning Cataplasms it's known, that we apply Emollients, Discutients, and Defensatives, during the first 2 or 3 days, according to the degrees of the Inflammation, afterwards we prefer Discutients, which are continued all the time of the Fluxion ; and during the rest of the Cure you must use Plaisters and Compresses soaked in Spirit of Wine warm'd.

If the Tendon of the Hand be hurt, we lay not only Defensatives upon the part, but also over the whole Arm. If the Puncture be made with a square or triangular Instrument, it's doubtless more to be feared than that which is made by a flat or round one, because of the great number of the divisions ; it there-

therefore requires more Circumspection. Lastly, if the Inflammation be great, and there be appearance of a Gangrene, you must Scarifie, and use all that is capable to awake the motion of the Spirits.

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## C H A P. IV.

*Of Wounds of the Ligaments and Bones.*

**W**OUNDS of the Ligaments differ not much from those of the Tendons, but in the more or less sensibility, and though they are not so painful nor dangerous, nevertheless it happens very often, that Putrefaction seizes it, by the abode of the Purulent Matters upon these parts.

If the Ligaments of the Joynts be hurt, I say that thickning Remedies are most contrary; because we must by all means oppose the coagulation of the viscus and salt Juices which entertain these parts, as also the forma-

mation of Ganglions and Anchilose, which cannot be mollified nor dissolved by the most powerful Medicines. If the Ligaments of a Joynt cannot be hurt without some Tendon receiving damage also ; it may be easily comprehended, that the Inflammation hinders them from obeying the motion of the Muscles, and that the Humours which supple the Ligaments and Glands, are not entertain'd in their ordinary fluidity ; and as I have shew'd in the *Aneurism*, that it condenses at the least heat, by the repose of its Particles, and it forms an Anchilose ; so I say its formation must be much quicker here, the heat being more excessive. Now it's evident, that a concatenation of accidents of this nature may utterly destroy the part ; for if the Anchilose which grow about the Joynts and Ganglions, which are form'd upon the Ligaments by the thickning and coagulation of the Nutritive Juice, cause the loss of motion ; the alteration and mixture of several Liquors of different nature, are very fit to putrifie it, by their purulancy and acidity.

The

The Purulent Humour corrupts and infects it, the Acid pricks and gnaws it, and the Viscous obstructs, and makes it immovable; It's doubtless by reason of the contrariety of their principles which destroy one another in the actions of the Medicaments, which causethem to be of so difficult a cure, and so hard to prevent the Ligaments from rotting.

We have made you observe in the Examination of the Fistula in *Ano*, that Wounds of the Joynts often degenerate into Fistula's, because the salt Juice abounds there from every part, and the *Pus* changes into a sharp and malignant Sanies, which filters into the Porosities of the Nervous Fibres of the part, making the Ulcer callous and fistulous; This Humour becomes sometimes so biting, that it destroys not only the Tendons and Ligaments, but gnaws also the Cartilages, and causes a Cariofity of the Bones.

To prevent all this, you must follow the same Method which we have prescribed in Wounds of the Tendons, that is to say, you must use

use every thing that tempers, sweetens, and is capable to correct the acrimony of the salts.

When the Wound hath run well for some days, and the swelling of the part a little gone down, you use a Balm made of Ox-gall, Spirit *An Ex-* of Wine, and *Mel. Rosat.* which *traordi-* hath the faculty of discussing and re- *nary Me-* solving the Coagulate Matters. Af- *dicine in* ter this manner you prevent the cal- *Wounds* losity of the Wound, and all other *of the* accidents; We commonly Cicatrife *Joynts,* with Humecting Medicaments, be- *&c.* cause Difficatives make it deform'd.

The Bones differ from the Tendons and Ligaments, in that their Contexture is more thick, close, and compact, and are nourished with a more salt and subtil Juice.

If the Wounds which happen to them be simple, the sole reduction of the Pieces maintained by Bandages is sufficient to cure them.

If the Fractured Bones press some Vessel or Tendon, and the Contusion be considerable, if you differ the reduction, the part falls into a Gangrene and Mortifies.

If

If some pieces of the Bone be separated, so that you cannot reduce them, you must make an Incision to pull them out. I know that this happens very seldom, and the Splinters must be very much intangled in the Flesh, if they cannot be reduced without Incision.

If the Bones be quite broke to pieces, and some great Vessels lacerated, you must cut off the Limb.

I speak not here of the Dressings which are used in all sorts of Fractures; I only recommend to you that the Bones be tied harder where broke, then any where else, to keep them reduced, and to hinder the Callus from growing too abundantly.

We know that Compound Wounds comprehend both those of the Flesh and Bones, and that besides the 18 tail Bandage, they require the application of several different Remedies. We use in the beginning Discurient Cataplasms, to evacuate part of the Matter by Transpiration.

You

You must by all means Suppurate, because we are obliged to wait for the generation of the Callus, and exfoliation of the Bone, besides a great Suppuration alters the Bones in a very little time.

It's therefore necessary that Discutients be used in stead of Suppuratives, and if in the first days we use Digestives, Spirit of Wine and Hony must exceed, you apply dry Lint upon the Bone till the Callus be form'd, and after it's generation you apply Boulsters on it, soaked in Spirit of Wine, in which *Sal. Armoniac.* and Camphire has been dissolved, which is a most excellent Medicine to cure Ulcers of the Bone, and to hasten Exfoliation.

You must observe, that there never grows good Flesh upon a rotten Bone, or that which is ready to exfoliate; It's always spongy, and one may say, that whenever they are of such a nature, it's a certain sign that the Bone must needs Exfoliate, which most ordinarily happens in long Suppurations.

The

The formation of the *Callus* grows according to the Patients way of Living; It's observed, that it grows too much, and renders the part unequal, when the Patient eats too plentifully, and when they use too spare a Diet, it grows not sufficient to reunite the part.

The Prognostic's of Compound Wounds are always very dangerous to Cachectical Persons, Old, and Pox't, whose Bones rot oftentimes without any Wound coming upon them.

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## C H A P. V.

### *Of Gunshot Wounds.*

**G**Unshot Wounds are always very dangerous, as well by reason of the great Contusion which accompanies them for the most part, as because the passages of the Blood are utterly stopped.

We know that the Bullet's passing through a part scatters the substance, and breaks the Vessels without any  
He-

Hemorrhagy, or Suppuration before three, four, five, or sometimes six days; the age, temperament, and nature of the part regulate these accidents; the reason of it is grounded upon the great agitation of the Bullet, and upon its round and blunt figure, that enters with so much force and swiftness into the Flesh, bruise and crushes the Vessels, so that it forceth their Tunics to glue themselves to one another, and so opposes the flux of Blood, unless some great Vessel be broke, and the Blood force a passage by its Impulsion. Of all Wounds there's *Obstruction* none where the Obstruction is greater *great in* than in these, and which consequently *Gunsbot* are more capable of Inflammation *Wounds.* and Gangrene.

They contain several particularities to which the Chyrurgeon ought to give his attention; The first is, to consider whether they be in any of the Venters, or the Limbs; if superficial or penetrating; if the Bullet hath passed through and through; if it has touched some important part tending to the functions of Life in its passage, which

which may be known by the succeeding symptomes.

But whether it has passed through, or found some obstacle in its passage, it's well known, that these kinds of Wounds are almost always accompanied with troublesome accidents, as rupture of some Vessel, fracture of a Bone, or Contusion, which is of least consequence.

*Accidents  
accompanying  
Gunshot  
Wounds.*

If the Orifice of the Wound be of a round figure, and grown less by the fluxion; the first Intention which you must satisfy is to dilate it; you excite by that means Suppuration, and procure a more equal Cicatrice; you discharge the part in letting the Wound bleed as much as is convenient, and prevent accidents. But first it's important to extract the Bullet, if you can, since it is its progress which marks the place which is to be dilated. If you cannot follow the track which it has taken without making an Incision, you put the Patient into the same posture he was in when wounded, that you may easier trace the Bullet, and observe the place where it stops; you afterwards dilate the Wound, minding  
two

*How to  
extract  
the Bul-  
let.*

two Circumstances; 1. You must avoid the great Vessels; 2. You must not discover the Tendons of the Joynts without necessity.

If the Bullet be engaged near some great Vessels, or in the middle of the Muscles, so that it cannot be ex- *When to leave the Bullet in.*tracted without causing some ill effect, you may leave it in the part, provided the Patient be not much incommoded with it. If it be in any of the Venters, you must leave it to Nature. If it stick in the Bones, you must gently move it, to draw it out more easily; because the Bone would of necessity putrifie. If it be in the Nervous parts, as in the Joynts, you must hasten its extraction, particularly when it's sharp, or of any corruptible Matter, for then you must not only extract it from the Nervous parts, but every part whatever.

You extract the strong Bodies by Attraction, or by Impulsion, with the Hand, Instruments or Medicines according to the part they lie in. If, for Example, a Bullet be passed the great Vessels, you will be obliged to extract it from the opposite part; but if it be on this side, you extract it through its entrance. Ne-

Nevertheless that general Rule hath its exception, for if some strange Body be upon the *Carpus* or *Tarsus* forc't from without inward, and should have passed the Bones; It would be a great temerity to Incise the bending Tendons of the Fingers, to force a passage through the opposite. In that case you must extract it by the same way it went in.

If the Bullet has ruin'd a Joynt, you must cut off the part, because the Ligaments and Bones being quite split to pieces, and their Splinters irritating the Tendons; it causes a Gangrene to seize presently on the part.

If the Bone of the Thigh be broken, you must dilate the Wound as much as is convenient, and advance the Suppuration, that you may have the liberty of extracting some pieces of the separate Bones, if there be any; Of the rest you follow the same method as in other Compound Wounds.

If there be any Vessels open'd, as the Subclavian Vessels, you make the Ligature; and if some Blood be diffused upon the Diaphragm, you must come to the Operation of *Empiema*.

If

If the Bullet has carried off a great part of the Bone, as we cannot cut proportionably so much Flesh as the substance of the Bone lost; for to convey Remedies thither, it happens that the Flesh that grows over it becomes callous, and sometimes ossified, forasmuch as the salt Juice which runs this way hardens it by little and little.

If the Trunk of a great Vessel be opened, we are often obliged to Amputate the part, because the part which receives no more Blood for its nourishment Gangrenates. If the Wound be only in the Flesh, you may bath it presently after the first dressing with Brandy, you soak Boulsters in it, and bind up the part with Compresses soaked in warm Wine, strengthen'd with Spirit of Wine.

The chiefest accidents that accompany Gunshot Wounds, are Tumours, Putrefaction, and Hemorrhagy, to dissipate the swelling we successfully use Traumatic Fomentations mixt with Spirit of Wine, or Cataplasms made of Urine, Rye Meal, Honey, and Infusion of Roses, or a Lye made of Vine-Ashes, in which you dissolve *Sal Ar-*

*Accidents  
which at-  
tend.*

Q

*moniac.*

*moniac*, and Brandy ; If the Tumour be not big, Suppuration is enough to carry it off ; If it be accompanied with hardness, you make some slight Scarifications.

To excite Suppuration in these kinds of Wounds, you use a Digestive made of *Ungt. Basilicon, Linament. Arcei, Ol. ovor. & Spirit. Vini* ; If Corruption be joined, you add *Theriac. Myrrh, Aloes, Sal Armoniac. Ol. Absinth. & Anthi* ; as you fear the Corruption, you animate them the more.

If the Putrefaction happen to a fleshy and spongy part, you dissolve *Egyptiac.* in Spirit of Wine, and mix it with the Digestive. For *Egyptiac.* being entirely a Dissicative, if it were used in Nervous parts, that are wont to dry up, it would dissipate the little humidity that remains there. If you use Injections, it's best to use the two *Aristolochias* boiled in White Wine, in which you dissolve Sugar Candy, Camphire, Myrrh, and Theriac.

*Bitter things not to be used in Injections of the Breast.*

You must observe, that Injections as well as other Remedies must be managed with prudence according to the parts where they are used. *Ex. Gr.* If you Inject into the Breast of

of one troubled with an *Empiema* a bitter and sharp Liquor, it would irritate the part, so that they would augment the accidents; in the like occasion we use with good success a Decoction of Barley, Agrimony, a very little Wormwood, and Centaury, Plantain, Birthwort, in which you dissolve *Mel. Rosar.* If this needs to be fortified, you boil them in Whitewine or Brandy.

The Tincture of *Perficaria Maculata* made with White wine, is also good to resist putrefaction; if you intend to make it stronger, you dissolve Myrrh, Aloes, and *Sal Armoniac* in Brandy; and mix with it the Solution of *Sal Armoniac* in Spirit of Wine, which produces the same effect; and to hinder the generation of new Corruption, you compass the Dressing with Spirit of Wine Camphorated; The Solution of a *Drachm* of *Mercurius* sublimate, or Arsenic in half a Pint of Spirit of Wine is excellent in great Putrefactions; or one Ounce of *Mercury* in two Ounces of *Aqua fortis*, which we mix with Lime Water or Brandy.

We also use with very good success in these occasions, the Solution of the Caustic Stone in Brandy, which we mix with the same quantity of Spirit of Wine Camphorated. All these Solutions are capable to waste and separate putrified and rotten Flesh, and also to consume the Cariosity of Bones.

After the effect of all these Remedies, you use Detorsive Decoctions made of red Roses, *Consolid. Maj. Quinquifolium*, Plantain, Agrimony, Nettles, Pimpernell, Periwinkle, St. Johns Wort, Purslain, Plantain, and Poppy Seed; with which you slightly sringe the Wound, so separate the rest of the Impurities that are there.

When you use Deterfives, you ordinarily joyn Suppuratives with them, as Turpentine, *Unguent. ex apta*, *Balsam. Arcei*, & *Ol. Hyperici*.

If the Wound has long suppurated, and the Flesh grows Luxuriant, you consume it with the Spirit of Sulphure put in the Mandificative; If it be the Humidity of the part, which

which causes this proud Flesh to grow, instead of the Mundificative, you use Allom Water, or the *Aq. Phagedenica*, or the Decoction of the Traumatic Plants made with Lime Water; or, Lastly, *Linamentum Arcei*, mixt with Myrrh and Fine Bole in Powder.

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**THE END.**

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